

**SUBMITTAL TO THE BOARD OF SUPERVISORS
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA**

352



FROM: Department of Public Health

SUBMITTAL DATE:
January 30, 2014

SUBJECT: Receive and File Emergency Medical Services (EMS) System Evaluation Reports. All Districts. Cost [\$0].

RECOMMENDED MOTION: That the Board of Supervisors:

1. Receive and file the Emergency Medical Services (EMS) System Evaluation Reports prepared by The Abaris Group.
2. Provide the department of Public Health (DOPH) direction to implement one of the options recommended by the Abaris Group for the County Master Ambulance Agreement.

BACKGROUND:

Summary

The Board of Supervisors approved item 3.10 on June 12, 2012 to authorize the Emergency Medical Services (EMS) Agency to hire a consultant to evaluate the County's present EMS system, including in the process those stakeholders that wish to participate. On July 24, 2012 a request for proposals (RFP) to hire a consultant to work on an improved Riverside County EMS Plan was released. On November 20, 2012, item 3.37, a consultant agreement with The Abaris Group was approved to conduct a two phased project.

Susan D. Harrington
Susan Harrington, Director
Department of Public Health

Departmental Concurrence

FINANCIAL DATA	Current Fiscal Year:	Next Fiscal Year:	Total Cost:	Ongoing Cost:	POLICY/CONSENT (per Exec. Office)
COST	\$ 0	\$ 0	\$ 0	\$ 0	Consent <input type="checkbox"/> Policy <input checked="" type="checkbox"/>
NET COUNTY COST	\$ 0	\$ 0	\$ 0	\$ 0	

SOURCE OF FUNDS: N/A	Budget Adjustment: No
	For Fiscal Year: 2013/14

C.E.O. RECOMMENDATION: **APPROVE**

BY: *Debra Cournoyer*
Debra Cournoyer

County Executive Office Signature

MINUTES OF THE BOARD OF SUPERVISORS

On motion of Supervisor Tavaglione, seconded by Supervisor Stone and duly carried, IT WAS ORDERED that the above matter is received and filed with the following additions: staff is directed to work with option A and incorporate ambulance services in underserved areas of Idyllwild and Pine Cove; and allow local jurisdictions to invest in advance life support equipment and personnel that will allow AMR a delayed response time of 2 minutes.

Ayes: Tavaglione, Stone, Benoit and Ashley
Nays: Jeffries
Absent: None
Date: February 11, 2014
xc: Public Health

Kecia Harper-Ihem
Clerk of the Board
By: *[Signature]*
Deputy

- A-30
- Positions Added
- 4/5 Vote
- Change Order

Prev. Agn. Ref.: 06/12/12 3.10,11/20/12 3.37 | District: All | Agenda Number:

16-3

**SUBMITTAL TO THE BOARD OF SUPERVISORS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
FORM 11: Receive and File Emergency Medical Services (EMS) System Evaluation Update**

DATE: January 30, 2014

PAGE: 2 of 5

BACKGROUND:

Summary (continued)

The goal of the Phase I of the EMS system evaluation included a comprehensive evaluation of the design and function of the current EMS system in Riverside County, development of EMS system improvement recommendations including options for the master ambulance agreement and development of recommendations for a scope of work for the master ambulance agreement. Phase II of the project will be development of an EMS system strategic plan that provides detail and establishes timelines for implementation of the system improvement recommendations from Phase I.

The EMS evaluation has been conducted using a four-pronged approach. This approach included convening a steering committee, a broad stakeholders group, key informant interviews and stakeholder focus groups. The project has been designed to be an inclusive and transparent process; one that has obtained valuable input from stakeholders of the Riverside County community. The Abaris Group conducted more than 100 interviews with individuals and key stakeholder groups. There were also three rounds of broad stakeholder meetings (12 meetings total) that occurred throughout the County. The steering committee included members representing the Riverside County Board of Supervisors, Western Riverside Council of Governments, Coachella Valley Association of Governments, Riverside County Fire Chiefs Association, the Hospital Association of Southern California, Riverside County Medical Association, and Riverside County Law Enforcement Administrators Association. Riverside County staff included on the steering committee included the EMS Agency Director, the County Fire Chief, the Director of Public Health and a representative from the Executive Office, Department of Mental Health, County Sheriff's Department and Riverside County Regional Medical Center (RCRMC).

The Abaris Group has provided two reports for the EMS Agency; The EMS System Evaluation Report that evaluates the current EMS system design and function inclusive of benchmarks compared to optimal system design and financial projections. The second report, EMS System Recommendations and Observations contains The Abaris Group's recommendations and observations for improving the EMS system based upon the results of the evaluation report. The two reports are available on the EMS Agency website www.rivcoems.org.

Key findings in The Abaris EMS System Evaluation Report include:

- The current EMS system is meeting the needs of residents and visitors. However, there are opportunities to make it even better.
- Many strengths in the current system have been identified by The Abaris Group, including:
 - The majority of the County is serviced by a two tiered Advanced Life Support (ALS) system.
 - The majority of the County is covered by one emergency ALS ambulance contractor who is meeting the current requirements of the agreement.
 - The majority of the County is covered by Emergency Medical Dispatch (EMD) with pre-arrival instructions.
 - Specialty Care Centers are in place for pediatrics, trauma, STEMI (Heart Attack) and soon to be Stroke (April 2014).
 - Strong stakeholder involvement in EMS Agency committees and projects.
- Opportunities that have been identified by The Abaris Group to be addressed in the system improvement recommendations include:
 - All response time standards and definitions are not based upon National and State guidelines and model system benchmarks.
 - The requirements in the current ambulance agreement are not as stringent as more contemporary agreements.

BACKGROUND:

Summary (continued)

- EMD is not currently used to prioritize medical resource response so multiple resources continue to be sent with high priority (Code 3 immediate response) despite no medical necessity for this level or urgency of response.
- There are multiple dispatch centers servicing the County with dissimilar communications infrastructure.
- Data collection, analysis and reporting on patient outcomes and customer service feedback is limited.

EMS system improvements proposed in The Abaris EMS System Recommendations and Observations Report include:

Recommendation 1. Commence an EMS Innovations Project (details to be developed during Phase II of this project) to better position the community for changes occurring both in the community and in healthcare with Healthcare Reform (The Affordable Care Act).

Recommendation 2. Continue the reinstatement of a state-of-the art continuous quality improvement (CQI) and medical-control program (i.e., enhanced medical direction) consistent with the recommendations of the report.

Recommendation 3. Collaborate and document opportunities to create an EMS system where the most appropriate and available EMS resource responds to an emergency request regardless of geographical jurisdiction.

Recommendation 4. Explore and develop improved efficiencies for EMS services provided to mental health patients.

Recommendation 5. Address the "EMS-to-ED" off-load ambulance delays in the form of a multidisciplinary collaborative.

Recommendation 6. Adopt stronger inter-facility transport (IFT) requirements and monitoring processes.

Recommendation 7. Adopt key communication recommendations from the report including; full deployment of EMD, priority response tiering and medical quality improvement, require CAD-to-CAD interfaces between communications centers and 9-1-1 ambulance providers, consolidate all ambulance dispatching functions for all 9-1-1 requests within a consolidated and high-performance communication center, encourage the participation of all EMS responders in the County's Public Safety Emergency Communications System (PSECS), establish a communications policy requiring responding ambulances to contact first-response agencies to receive on-scene updates and standardize data collection requirements and quality improvement standards and monitoring from dispatching operations.

Recommendation 8. Change the EMS governance structure to include; appropriate EMS Agency staffing, employ a full time EMS Agency medical director, review and consolidate EMS advisory committee structure as appropriate, re-evaluate and "zero base" all current EMS advisory committees and determine if consolidation, re-timing and/or elimination is a possibility of each advisory committee.

Recommendation 9. Evaluate and develop strategies to improve on-line medical direction including; implementation of optimal patient movement solutions, determine the ideal number of base hospitals to manage EMS direction in the field while maintaining a sufficient span of control from the EMS Agency and investigate ways to improve system coordination with a uniform medical control model (e.g., Medical Alert Center, Medical/Health Communications Center)

Stakeholders raised some concerns related to The Abaris Group recommendations and how they would be implemented. Some of the stakeholder concerns include first responder and ambulance response time standards, mutual aid agreements or "boundary drops", consolidation of dispatch services, participation in the PSEC system and modified resource response and priorities utilizing EMD protocols. Continued discussion of these concerns will be part of the strategic planning process in Phase II of the project. During Phase II The Abaris Group will continue to work with the EMS Agency and stakeholders to develop a strategic plan that evaluates and prioritizes each recommendation for implementation. The goal of the strategic plan will be to establish realistic implementation timelines that provide for optimal system

BACKGROUND:

Summary (continued)

performance focused on improving patient outcomes within an economically sustainable EMS system design.

The County Master Ambulance Agreement

The Board of Supervisors approved the Master Ambulance Agreement with American Medical Response (AMR) on March 30, 2004, item 16.2, this agreement term was through June 30, 2009 with the option for two additional three year extensions. The Board of Supervisors approved the first three year extension to the agreement in June 2009, item 3.17 extending the agreement term until June 30, 2012. The Board of Supervisors approved the second three year extension on June 12, 2012, item 3.10, extending the agreement until June 30, 2015.

Legal requirements for establishing Exclusive Operating Areas (EOAs) within a State approved EMS Transportation Plan are found in California State Law which prescribes the following:

California Health and Safety Code, Division 2.5, 1797.224. A local EMS agency may create one or more exclusive operating areas in the development of a local plan, if a competitive process is utilized to select the provider or providers of the services pursuant to the plan. No competitive process is required if the local EMS agency develops or implements a local plan that continues the use of existing providers operating within a local EMS area in the manner and scope in which the services have been provided without interruption since January 1, 1981*. A local EMS agency which elects to create one or more exclusive operating areas in the development of a local plan shall develop and submit for approval to the authority, as part of the local EMS plan, its competitive process for selecting providers and determining the scope of their operations. This plan shall include provisions for a competitive process held at periodic intervals. Nothing in this section supersedes Section 1797.201. *Referred to as the "grandfathering" clause.

The majority of the County's EOAs qualify under the grandfathering clause of 1797.224, therefore the County is not subject to the competitive process requirement for those EOAs if they choose to continue using the existing provider. If the County decides to award EOAs through a competitive bidding process, the County forfeits its grandfathering rights and must put those EOAs out to bid every 10 years according to current State requirements. Non-exclusive ambulance operating areas are Indio, Cathedral City, Pass and Mountain zones. Non-exclusive ambulance operating areas would need to be competitively awarded in order to meet State legal requirements for exclusivity.

Ambulance agreement improvements proposed in The Abaris EMS System Recommendations and Observations Report include:

Recommendation 10. Implement improvements to existing contract parameters with all of its 9-1-1 ambulance providers.

Recommendation 11. Consider one of three models of ambulance exclusivity as documented in the report and, as appropriate, begin a request for proposal (RFP) process to establish appropriate providers throughout the county. Options:

- Option A Memorialize and reaffirm the existing ambulance franchise zones and their key parameters with contractual updates as listed in this report.
- Option B Develop a revised EOA plan that would include multiple EOAs each with local parameters and characteristics consistent with the local needs and then conduct an RFP process for each zone.
- Option C Define a single ambulance EOA for the entire County contract and conduct an RFP process consistent with the single zone and the contract and performance parameters in this report.

BACKGROUND:

Summary (continued)

The Department of Public Health (DOPH) recommends that the master ambulance agreement include provisions that assure optimal operational performance and financial stability within a State approved EMS transportation plan. Optimal operational performance and financial stability are best accomplished through an integrated, coordinated regional ambulance transportation system. Both options A and C provide for this type of ambulance transportation system. Dividing up the system into multiple EOAs each serviced by a different ambulance provider is suboptimal for the Riverside County EMS system due to increased oversight costs and complexities, operational fragmentation of the regional ambulance transportation system, increased mutual aid requirements and loss of economies of scale. DOPH is therefore recommending that the Board of Supervisors select either option A or option C.

Impact on Citizens and Businesses

The residents and visitors of Riverside County require the services provided by an efficient EMS system. The EMS system evaluation project will result in improvements to the County EMS plan designed to optimize emergency medical care to residents and visitors thereby minimizing morbidity and mortality from acute illnesses and traumatic injuries.

Riverside County EMS System

RECOMMENDATIONS & OBSERVATIONS

THE ABARIS GROUP

MARTINEZ, CA



Summary of Key EMS Study Recommendations

*For the Consideration of
County and EMS Stakeholders*



Key Recommendations

The following is a summary of key recommendations that are a result of analysis and data gathered by The Abaris Group in the firm's "As-Is" Report for the County of Riverside published in August 2013.

- 1) Commence an Emergency Medical Services (EMS) Innovations Project (Phase II of this project) to better position the community for changes occurring both in the community and in healthcare with Healthcare Reform (The Affordable Care Act).¹
- 2) Continue the reinstatement of a state-of-the art continuous quality improvement (CQI) and medical-control program (i.e., enhanced medical direction) consistent with the recommendations of the report
 - Include a comprehensive customer feedback mechanism with loop closure and regular reporting
- 3) Collaborate and document opportunities to create an EMS system where the most appropriate and available EMS resource responds to an emergency request regardless of geographical jurisdiction
 - Such a system would study the impact of "boundary-drop" mutual-aid systems (i.e., Orange County boundary-drop system) throughout the county, ensuring "boundary-drops" provide equitable services and does not subsidize surrounding communities
 - Further consider the first response-time standards identified in The Abaris Group's report including their documentation and accountabilities
- 4) Explore and develop improved efficiencies for EMS services provided to mental health patients:
 - Investigate alternatives to 72-hour holds (Welfare and Institutions Code Section 5150) for mental health patients
 - Consider additional mental health training for EMS and law enforcement
 - Determine if alternative destinations can be developed for mental health patients
- 5) Address the "EMS-to-ED (emergency department)" off-load ambulance delays in the form of a multidisciplinary collaborative, with parameters monitored by the EMS Agency:
 - Require substantial key executive leadership involvement from all appropriate stakeholders with a clear mandate to reduce and eventually eliminate ambulance off-load delays
 - Further examine the option to institute GPS tracking to monitor wall time/delays with ED volume increases included when evaluating wall time/delays
- 6) Adopt stronger inter-facility transport (IFT) requirements and monitoring processes:

¹ Some of the recommendations included in this document will be further defined and studied during the Phase II collaboration portion of this project.



- Conduct felony background and Medicare “excluded-provider” checks and disclosures of all current or past Office of Inspector or other payer investigations
 - Insist on current audited or “reviewed” financial statements from ambulance permits to ensure provider credibility and solvency
 - Consider requiring a physical presence within the county at a credible base of operations (i.e., formal dedicated office) for the applicant
- 7) Adopt key communication recommendations from the report, this should be based on cost and current financial status of the County:
- Fully deploy the provision of Emergency Medical Dispatch (EMD) services to all EMS requests
 - o Pre-arrival instructions on 100 percent of all appropriate EMS requests
 - o Further study of call priority response tiering and response times
 - o CQI policies/practices completed on all requests
 - Mandate computer aided dispatch (CAD) -to-CAD interfaces between the communications center and 9-1-1 ambulance providers throughout the county
 - Examine further the consolidation of all ambulance dispatching functions for all 9-1-1 requests within a consolidated and high-performance communication center, with the exception of those communities who dispatch their own Police Department/Fire Department
 - Encourage the participation of all EMS responders in the County’s Public Safety Emergency Communications System (PSECS) as appropriate
 - Establish a communications policy requiring responding ambulances to contact first-response agencies to receive on-scene updates
 - Standardize data collection requirements and quality improvement standards and monitoring from dispatching operations
- 8) Change the EMS governance structure:
- Adjust EMS Agency staffing as comparable to like-sized counties
 - o Add “EMS specialist” staff positions (estimated to be at least 1 up to 3 specialist positions) per recent statewide EMS agency survey
 - o Achieve a full time EMS medical director
 - o Study and implement specialized programs (e.g., mental health, inebriates, etc.)
 - Review and consolidate EMS advisory committee structure as appropriate
 - o Re-evaluate and “zero base” all current EMS advisory committees
 - o Determine if consolidation, re-timing and/or elimination is a possibility of each advisory committee
 - Take appropriate steps as called for by the consolidation study
- 9) Evaluate and develop strategies to improve on-line medical direction:
- Implement optimal patient movement solutions



- Determine the ideal number of base hospitals to manage EMS direction in the field while maintaining a sufficient span of control from the EMS Agency, while considering costs to agencies
 - Investigate ways to improve system coordination with a uniform medical control model (e.g., Medical Alert Center, Medical/Health Communications Center)
- 10) Address existing contract parameters with all of its 9-1-1 ambulance providers, with specific parameters to be identified during Phase II of the project:
- Targeting key operational and performance issues required for a responsive and contemporary countywide ambulance delivery system
 - Creating or updating response times for each entity, including participating agencies that partner with private ambulance services
 - Establishing performance penalties with bench mark financial sanctions for under-performance
 - Crafting a written agreement and a timetable for participation with countywide data and information technology initiatives
 - Obtaining a countywide agreement to participate in medical control and quality-improvement initiatives
 - Adopting various equipment and vehicle standardizations
 - Developing reimbursement formulas for first responder costs and supplies used on EMS calls
 - Disclosing of key system status plan (SSP) provisions including advanced notification and approval by the Riverside County EMS Agency (REMSA) of planned adjustments to the SSP
 - Providing quarterly disclosure of financial statements at a unit (Riverside County) level, including continuance of the annual audited statement requirement
 - Seeking agreement to participate, negotiate in good faith and implement system enhancement features for future system innovations (assuming financial sustainability) of the EMS delivery system
 - Adopting a variety of contract clauses that permit the contract to be amended based on researched and verified efficacy and adopted ambulance delivery system benchmarks that demonstrate a high potential for system enhancements and alignment with the “triple aim” of Health Reform



- 11) Consider one of three models of ambulance exclusivity as documented in the report and, as appropriate, begin a request for proposal (RFP) process to establish appropriate providers throughout the county:
 - In addition, obtain commitments to achieve the ambulance and contracting performance as listed in these recommendations and in the report
 - The three broad options are listed in the report but the County is not limited solely to these three options:
 - (1) Memorialize and reaffirm the existing ambulance franchise zones and their key parameters with contractual updates as listed in this report, should further examine a timeline with a specific expiration date to negotiate with current provider
 - (2) Develop a revised exclusive operating area (EOA) plan that would include multiple EOAs each with local parameters and characteristics consistent with the local needs and then conduct an RFP process for each zone
 - (3) Define a single ambulance EOA (with the exception of the two current zones that have California Health and Safety Code Section 1797.201 grandfathered rights) for the entire county and conduct an RFP process consistent with the single zone and the contract and performance parameters in this report

EMS System Observations



EMS Providers

1) Fully utilize EMD countywide including all of its capabilities

Every medical call should be evaluated and the priority determined; in turn, the ambulances are only dispatched with lights and siren when appropriate. Incorporate non-emergency response time standards into first responder and ambulance agreements.

2) Create closest resource policy

Consider adopting a countywide policy that the closest, most appropriate resource be dispatched to a medical call.

3) First response system

- Establish a collaboratively designed response-time standard
- Encourage the establishment of an “auto-response” and “boundary-drop” system
- Establish a minimum level of first responder equipment – Ensure all first responders have automatic external defibrillators (AEDs) as part of their medical equipment.

4) Further examine an air-medical auto-launch policy

Study further an auto-launch policy for helicopter emergency medical services (HEMS) based on geographic area, with criteria, that takes into consideration transport distance to appropriate receiving hospital for patient type (e.g., trauma, pediatric, burn). Consider establishing an acceptable over-triage rate for HEMS patients discharged from the ED, similar to the trauma system ED discharges or ST-elevated myocardial infarction (STEMI) false activations.

5) Review pediatric trauma center capability

Study and ensure the appropriate level of pediatric resources are available at the designated trauma centers and in the community.

6) Update trauma plan

The current trauma plan was written in 2001 and should be reviewed and updated.

7) Designate STEMI receiving centers in East County

Additional STEMI hospital resources are necessary to augment the one designated hospital in East County.

8) Expand STEMI program

Consider growing the program to include related cardiac events, such as cardiac arrest, for protocol development, tracking, and improved patient outcomes.



9) Establish stroke program

Create necessary protocols and designate receiving hospitals for stroke patients to improve stroke patient outcomes.

10) Develop additional inter-facility provider requirements

Include a national, felony background check as well as a copy of current, audited financials to ensure credibility and solvency. Consider requiring a physical presence within the county. Review and possibly increase current application and on-going fees that are sufficient to encourage a resource commitment to Riverside County to become financially viable.

Moving forward, Riverside County has four primary options to manage the IFT marketplace:

a) Maintain Competitive IFT Market With Adjustments – Recommended

This is the current environment in Riverside County for basic life support (BLS) and critical care transportation (CCT). The benefits include a significant number of ambulances within the county for routine and disaster needs as well as a competitive market that may offer faster response times and the ability for insurance carriers, hospitals, and other providers to negotiate for lower transport costs. However, a competitive market is tougher to manage from a regulatory perspective and there is little ability to force ambulance providers to meet response time standards or contribute back into the EMS system. The Abaris Group recommends below adjustments that should be made to the IFT programs for Riverside County.

b) Define and Bid Some IFT EOAs

This combines the same strengths and weaknesses of the competitive and exclusive options. When only certain zones are established as exclusive, there is a legitimate concern that outlier, isolated areas may not be able to secure IFTs when needed.

c) Create IFT EOA(s) that Covers Riverside County Completely

Advanced life support (ALS) IFT is part of the Riverside County 9-1-1 EOA zones. Similar to creating an EOA for emergency services, this option ensures IFT services anywhere within the county, mandates response times with non-compliance penalties, monitors fewer providers, and captures some of the IFT revenue to benefit the EMS system. With an exclusive provider(s) for IFT, any current provider who is not a winning bidder for a zone would no longer be able to operate in Riverside County. This approach can lead to perceived predatory pricing by the private hospitals and insurance providers. The number of available ambulances would most likely decrease, possibly impacting transportation during a disaster.

d) Create combined 9-1-1 and IFT EOA(s) that Covers Riverside County Completely

This option has the same benefits and concerns as a stand-alone IFT EOA (i.e., Option #3); however, it offers the advantage of one provider for both services. This difference allows for the option of a single fleet of ambulances to perform all ambulance transports. This should be more efficient for the private ambulance provider, which should translate to lower costs or more resources that would be returned to the system in terms of other system optimizations (i.e., public education, stakeholder training resources, lower overall ambulance rate costs, etc.) put



back into the EMS system. However, in looking at the San Bernardino County ambulance rate structure, which currently has a combined EOA for both types of service, a 10-mile ALS urban transport is only \$7.22 less (see Figure 1) in that system in spite of the potential

9-1-1 Ambulance Rates			
Component	Riverside	San Bernardino	
		Urban Operating Areas	Rural/Wilderness Operating Areas
ALS-1	\$ 1,229.81	\$1,313.69	\$1,445.05
Mileage (per mile)	\$ 34.05	\$24.94	\$24.94
10-Mile Transport	\$ 1,570.31	\$1,563.09	\$1,694.45
<i>Difference compared to Riverside</i>		-\$7.22	\$124.14

Note: Review of partial rate structures, e.g., BLS, oxygen, and night rates not included
Source: EMS agencies

Figure 1 – Ground Ambulance Comparison Rates

overall revenue advantage through the San Bernardino 9-1-1/IFT ambulance franchise combination. In the rural areas, a similar transport would actually be more expensive by \$124.14. There also does not appear to be other resources returned to the San Bernardino County EMS system commensurate with the IFT franchise as witnessed through a separate study recently by The Abaris Group. In addition, there were considerable concerns raised by one hospital/payer provider in San Bernardino County (Kaiser) about predatory pricing by the current ambulance provider that they believe is permitted with that county's IFT franchise.

Communications and Dispatch

1) Consolidate the Ambulance Dispatching Function for all 9-1-1 Requests within a Communication Center in the county

The current ambulance contractor's dispatch center provides no secondary primary public safety answering point (PSAP) function or EMD services, and only serves to receive 9-1-1 requests for service from either the County Emergency Communications Center (ECC) or one of several city PSAPs. Secondly, it receives and processes inter-facility transfer requests from various medical institutions. The 9-1-1 ambulance dispatching function should be conducted through the comprehensive, accredited communication center, only requiring the ambulance contractor to place a system status controller at the communication center site to manage the unit deployment and system status plan for the contractor. This would reduce the amount of time required to alert ambulances for 9-1-1 responses, as requests to the communication center would be alerted and dispatched at that time, rather than having to wait for dispatch information to be transferred to the ambulance contractor's dispatch center.

Additionally, with the vast majority of medical 9-1-1 calls coming to the communication center, proper prioritization of calls and tiering of EMS responses can be facilitated, thereby reducing the risk of responding ambulances lights and siren to all requests. Future innovations would also be easier to adopt, test and monitor at such a communication center site (i.e., nurse triage, an RN/MICN, in communication center, etc.)



2) Ensure the Provision of EMD Services to all requests for emergency ambulance in Riverside County

The provision of EMD for medical 9-1-1 calls is firmly established as the standard of care in dispatching operations. While the majority of Riverside County enjoys the provision of EMD, nearly 300,000 residents in five communities do not receive EMD services. The EMS Agency should encourage all of the communities not providing EMD currently to establish a plan and timeline to provide for or contract for the provision of EMD to its citizens. The EMS Agency should assist with identifying possible sources of funding to assist those communities with the cost of establishing or contracting for the provision of EMD.

3) Encourage the Participation of all EMS Responders in the County's PSEC Communications System

The Riverside County Public Safety Enterprise Communications system provides a state of the art communications network with enormous capacity and potential to improve emergency communications county-wide. While the participation of the various cities and public safety organizations is a matter of marketing the benefits and costs to those entities by the county, the EMS Agency can build in a requirement for the successful bidder's participation into their anticipated request for proposals.

4) Establish Communications Policy Requiring Responding Ambulances to Contact First Response Agencies to Receive On-Scene Updates

While this would seem on the surface to be an automatic procedure, it was, in fact, stated as an ongoing issue for several first response agencies. As such capabilities should exist with most if not all agencies, the EMS Agency should ensure that it is a system requirement with the contracted ambulance provider with appropriate sanctions for continued non-compliance.

5) Standardize Data Collection Requirements and Quality Improvement Standards from Dispatching Operations

The collection of dispatch information for medical 9-1-1 requests varies throughout Riverside County, and the ability to validate the timeliness and quality of services provided is hampered by both inconsistent data collection and quality assurance processes. The EMS Agency should use a collaborative process with all affected organizations to establish a common set of data definitions and collection requirements to allow for standardized review and evaluation. Using the California Emergency Medical Services Information System (CEMSIS) standards, the EMS Agency can establish the minimum requirements for data collection from all organizations that touch the medical 9-1-1 call, and develop a quality assurance/improvement process using standardized quality indicators to ensure and validate the quality of services being provided throughout the system.



System Benchmarks

1) Increase EMD to countywide percent coverage

Ensure that all of all eligible requests for EMS response are prioritized through a medical priority dispatch system (MPDS) that determines most appropriate resources.

2) Adjust system fees

Ensure transport providers are paying an equitable share of the dispatching and other services it utilizes within the EMS system.

3) Establish and monitor first response goals

Define, implement and monitor countywide response time standards for first responder services, especially where there is a relaxed response time standard (i.e., Cities of Riverside and Corona).

4) Identify enhanced transport response-time standard by EMD countywide

Determine the appropriate response time based on the MPDS information for all medical calls; ensure that all transport providers are in compliance with county response time standard.

5) Consider response time refinement

Response of 7:59 minutes, 90 percentile and the corresponding support performance standards or a revised standard countywide with documented ALS first-response capabilities.

6) Consider eliminating compliance exemptions

Consider eliminating all exemptions except during a major disaster as defined by the REMSA contract administrator.

7) Simplify penalties assessed

Review current penalties for frequency and complexity to track; identify key performance indicators and penalize appropriately (to be determined in Phase II of the project); consider eliminating performance credit.

8) Adjust outlier definition (i.e., "calls longer than...")

Consider using a percentage of response time (e.g., 150-200 percent) instead of 10:00 minutes to more appropriately identify outliers in all types of response areas (i.e., urban, suburban, rural, wilderness).



Continuous Quality Improvement

- 1) **Re-establish and sustain a county-wide, coordinated CQI program with the consideration of establishing a Business Associate Agreement (BAA) with all entities to ensure the ability to share patient outcome data for a successful CQI program**
- 2) **Dedicate appropriate resources for success**
Assure REMSA has the staff and other resources committed to fully pursue an “excellence” mission desired with full CQI implementation and other key initiatives, while considering that staffing does not exceed like-sized communities.
- 3) **Develop countywide EMS training center**
Similar to the county police and fire training center, establish an EMS equivalent program; consider using assessed EMS liquidated damage penalties to fund this program. Consider implementation of standardized trainers and training material to ensure standardized training.
- 4) **Reestablish county-wide coordinated continuous quality improvement (CQI) Technical Advisory Committee (TAC) –** While there exists an extensive network of committees reviewing and reporting on the quality of care being provided at various phases of the patient care experience within the system, there is no overarching body responsible for putting all of this information together in a comprehensive picture of the patient experience. REMSA should reestablish the CQI TAC with responsibility for oversight and coordination of all CQI activities within the system. It should be chaired by the REMSA Medical Director and staffed by a REMSA CQI Coordinator.

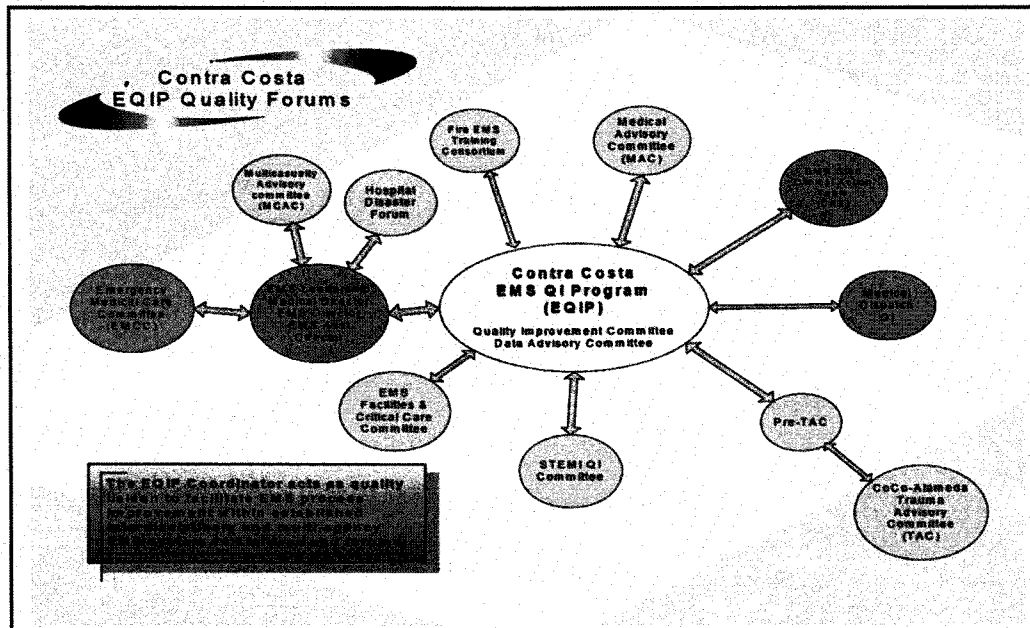


Figure 2 –Sample Contra Costa EQIP Quality Forums



Figure 2 graphically represents the Contra Costa County Emergency Medical Services (EMS) Agency CQI relationships, and the interaction between the various QI groups within that system.² This method leads to a formalized CQI process for any EMS issue with trending, quantifying, and identification of concerns for training opportunities (e.g., under/over trauma triage, false STEMI activations, medication errors). A coordinated approach may also improve participation of EMS system stakeholders. For example, there is no EMS provider involvement at specialty care system meetings.

5) Consider a “Just-Culture” approach to quality review initiatives

The National Association of Emergency Medical Technicians (EMT) has announced that they are encouraging all EMS agencies to adopt a “just-culture” approach to system quality improvement.³ The term “just culture” refers to a value system of shared responsibility in which health care organizations are accountable for responding to their staff performance in a fair and just manner. The staff is likewise then responsible for their choices and reporting both their errors and system vulnerabilities. Thus, a process where “blame” is not the first reaction to an error, but rather an understanding that the error is likely a failure in the system design.

The just-cause environment breaks behaviors down to three types of errors:

- “Human error”
- “At-risk behavior”
- “Reckless behavior”

These categories help create a framework for consistency among evaluators and instill a sense of confidence and accountability for the individuals involved.⁴

6) Select online protocol vendor

Timely and up to date protocol information is crucial for patient clinical care. A vendor should be endorsed to provide Riverside County EMS policies online and through smartphone/tablet applications.

² <http://cchealth.org/ems/quality.php>

³ http://www.naemt.org/WhatsNewALLNEWS/12-07-13/Board_Adopts_New_Position_Statement_on_Just_Culture_in_EMS.aspx?ReturnURL=%2Fdefault.aspx

⁴ <http://www.justculture.org/>



Industry Trends and Best Practices

1) **Implement a 9-1-1 appropriateness campaign**

Utilize the existing public service announcement to develop a subsequent “When to Call 9-1-1” educational campaign and website.

2) **Quantify and possibly develop a pre-hospital mental health program**

Quantify the volume of 5150 transports and determine whether an alternative response and transport program may be more appropriate.

3) **Quantify and possibly develop a program for serial inebriates**

Quantify the volume of serial inebriate transports and determine whether an alternative response and transport program may be more appropriate.

4) **Implement a solution to address the needs of high system EMS users**

Identify the heaviest users of the 9-1-1 system and develop a multi-disciplinary approach to reduce the frequency used. Consider community resources to manage specific patients with over-utilization of the EMS system. Further study the option of working with insurance companies to enhance case management.

5) **Research community paramedicine programs**

Follow community paramedic and mobile healthcare programs being developed and implemented in other EMS systems for suitability in the local environment. Compare these programs with the quantified local needs (e.g., 9-1-1 users who are the least served by the current health-care system) and define opportunities to partner with public and private entities to financially support a potential program.

6) **Monitor CMS Health Care/EMS Innovation Awards**

The Center for Medicare and Medicaid Services (CMS) EMS innovation programs will mature over the three-year implementation period and there is a new round of funding applications underway which may allow more EMS innovations to be tested. The REMSA should monitor these projects for outcome results and consider their appropriateness and applicability should they be replicatable locally.



ED and Hospital Capacity Challenges

- 1) ED capacity and resultant EMS patient off-load delays need to be addressed sooner and not wait for the full strategic planning process (Phase II)
- 2) Timing is key due to significance of the problem, impact on EMS delivery system, timeliness and quality of care
- 3) Statewide initiatives are also now underway
- 4) Recommend a local collaborative model be initiated immediately
- 5) Focus on:
 - Population innovations
 - EMS innovations
 - Hospital innovations



Consideration for Ambulance Exclusivity and Zone Configuration



Considerations for Exclusivity and Zone Configuration

The Abaris Group considered several options for the county with regard to the establishment of Exclusive Operating Area(s) and the configuration of either multiple EOAs within the county or a single EOA for the entirety of Riverside County with separate and distinct sub-zones for compliance analysis and carving out only those eligible H&S Code Section 1797.201 cities. While three distinct options are presented, there are many permutations to these three options. The relative strengths and weaknesses of the options are discussed below.

Option A - Maintain Current Grandfathered System

This option would maintain the current makeup of the EMS system, with the current grandfathering option continued for many of the EOAs.

Option A – Maintain Current Grandfathered System

Strengths

- Based on stakeholder comments, the current system is performing well and generally meets expectations
- Would maintain a configuration of separately contracted EOAs familiar to the system participants
- May provide for continuity of service delivery
- Quite possibly the least expensive and least complicated option for the county
- Maintains relationship with current contracted provider
- Retains more local control of the EMS system while maintaining state action immunity based upon approval of the EMS Transportation Plan
- The current contracted provider is cooperating for the ambulance service in the three, non-exclusive operating areas

Weaknesses

- Maintains a non-competitively awarded system with limited incentive for creative enhancements to service delivery
- Maintains the status quo, which has been criticized by several system participants
- May continue the use of zones which might be better incorporated into reconfigured response areas and improved response leverage
- Potentially creates an “ad-infinitem” monopoly
- At least three ambulance operating areas are either not EOAs (i.e., Indio, Cathedral City) or have not had a completed bidding process (i.e., Mountain Plateau Zone and Pass Zone) within the state mandated periodic interval and thus would need to be bid if the county wanted to establish them as EOAs, as they do not qualify under H&S Code sections 1797.201 or 1797.224



Option B - Multiple EOAs Separately Bid

This option would be very similar to the current makeup of the EMS system, with the obvious difference being that the current EOAs would be competitively bid, versus the current grandfathering option utilized for many of the EOAs.

Option B – Multiple EOAs Separately Bid

Strengths

- Would maintain a configuration of separately contracted EOAs familiar to the system participants
- Could allow for distinct contracting specifications individualized by EOA
- Could maximize EOA specifications and allow for different bidders to customize options, rather than bid one set of specs for entire county
- Could permit more public/private models

Weaknesses

- Could fragment county coverage if bidders are not required to bid all EOAs
- Leaves larger, more sparsely populated areas without incentive for bidders to bid them
- If multiple awardees for separate EOAs, will create the need for multiple mutual aid agreements and potential for poor coverage during peak periods
- Devalues the potential financial attractiveness of county-wide EOA as a bid opportunity
- Creates complex REMSA contracting/monitoring duties at increased expense to the county
- System parameters must be approved by CA EMS Authority



Option C - Single County-wide EOA Bid

This option would eliminate the multiple, separate EOAs and establish the entirety of Riverside County as an EOA for ALS ambulance service with the exception of the qualified H&S Code section 1797.201 zones (i.e., Cove Cities and the Idyllwild Fire Protection District).

Option C – Single County-Wide EOA Bid

Strengths

- Could maximize the financial attractiveness of the Riverside EOA by providing for a very large, contiguous service area as a bid opportunity
- Would eliminate the potential for more than one vendor for the county to have to contract with and oversee their operations
- Could provide the county with maximal leverage to obtain system enhancements and cutting-edge technology at a competitive price
- Creates a blank slate from which the county can produce a “system by collaborative design,” rather than a “system by evolution”
- Establishes a single, uniform system designed for quality service delivery for all areas of the county, particularly the more difficult areas to serve
- Without such the county could experience zones with no providers in the future (i.e., ICEMA’s 27 zones some with no providers)
- Could permit collaborative public/private partnerships using a single accountable entity model

Weaknesses

- County would forfeit its current grandfathering rights over EOAs
- Will most likely leave some holes in the system due to existing, qualified H&S Code section 1797.201 communities (Idyllwild and Cove Cities)
- Will require collaborative negotiation for areas that are currently non-exclusive but served by alternate providers
- Will require a comprehensive and potentially expensive request for proposals (RFP) process
- System parameters must be approved by CA EMS Authority
- Once the contract is bid, bids must continue to occur at periodic intervals. The State’s current requirement is every ten years.

H&S Code Background

The California Health and Safety Code allows counties to designate “one or more” exclusive-operating areas. While this option may have been advantageous when counties were looking to “grandfather” providers into specific, traditional service areas, it is of minimal value when looking to maximize a county’s opportunity to create a very attractive exclusive zone for the purpose of bidding the system and assuring high performance. While all of the current “EOAs” designated by Riverside County made sense from the standpoint of “continuous, uninterrupted service delivery” in specific areas of the county, these zones today do not have the same rational they once if anticipating going to bid. Dividing an enormous EOA the size of Riverside County and reducing it to much smaller, individual EOAs (and presumably) bidding them separately will likely devalue the overall system and the attractiveness of the bid process to outside bidders.



Performance Evaluation Zones would be defined as non-EOA (i.e., smaller than an EOA), compliance zones. They are calculated on a periodic basis, as determined by the EMS Agency in coordination with the affected areas. Their purpose is to provide a more defined area of analysis that would not directly impact the contract compliance analysis process, but would be conducted to ensure that specific areas of the county are not being underserved from the standpoint of response time performance. The specific, required performance level would be negotiated and defined in the contract, and continued non-performance in these areas would trigger a mandatory system status plan evaluation and corrective action plan.

Other Ambulance Zone – Observations and Recommendations

The charge to The Abaris Group for this section of the report is to review the existing ambulance zones and recommend changes to their configuration, as deemed appropriate. The Abaris Group pursues this objective from the perspective that the EMS Agency and the County wish to maximize the strength and viability of the county franchise, creating a financially attractive bidding opportunity for potential providers of service, and thereby maximize the leverage of the County for system improvements and opportunities for excellent patient care. The Abaris Group also understands that this objective must be tempered with prudent consideration of existing public sector providers, particularly where they clearly qualify under California Health and Safety Code section 1797.201, or where their tax subsidized service model is crucial for service delivery to sparsely populated, difficult areas to serve.

The relevant sections of the California Health and Safety Code are listed below in their entirety for the clarification of the reader. These sections of law outline the process whereby counties may establish exclusive operating areas, and also clarify the retained authority for cities that qualify under the specifications of the H&S Code section 1797.201 statute.

“1797.6. (a) it is the policy of the State of California to ensure the provision of effective and efficient emergency medical care. The Legislature finds and declares that achieving this policy has been hindered by the confusion and concern in the 58 counties resulting from the United States Supreme Court's holding in *Community Communications Company, Inc. v. City of Boulder, Colorado*, 455 U.S. 40, 70 L. Ed.2d810, 102 S. Ct. 835, regarding local governmental liability under federal antitrust laws.

(b) It is the intent of the Legislature in enacting this section and Sections 1797.85 and 1797.224 to prescribe and exercise the degree of state direction and supervision over emergency medical services as will provide for state action immunity under federal antitrust laws for activities undertaken by local governmental entities in carrying out their prescribed functions under this division.”



“1797.85. “Exclusive operating area” means an EMS area or subarea defined by the emergency medical services plan for which a local EMS agency, upon the recommendation of a county, restricts operations to one or more emergency ambulance services or providers of limited advanced life support or advanced life support.”

“1797.201. Upon the request of a city or fire district that contracted for or provided, as of June 1, 1980, pre-hospital emergency medical services, a county shall enter into a written agreement with the city or fire district regarding the provision of pre-hospital emergency medical services for that city or fire district. Until such time that an agreement is reached, pre-hospital emergency medical services shall be continued at not less than the existing level, and the administration of pre-hospital EMS by cities and fire districts presently providing such services shall be retained by those cities and fire districts, except the level of pre-hospital EMS may be reduced where the city council, or the governing body of a fire district, pursuant to a public hearing, determines that the reduction is necessary.”

“1797.224. A local EMS agency may create one or more exclusive operating areas in the development of a local plan, if a competitive process is utilized to select the provider or providers of the services pursuant to the plan. No competitive process is required if the local EMS agency develops or implements a local plan that continues the use of existing providers operating within a local EMS area in the manner and scope in which the services have been provided without interruption since January 1, 1981. A local EMS agency which elects to create one or more exclusive operating areas in the development of a local plan shall develop and submit for approval to the authority, as part of the local EMS plan, its competitive process for selecting providers and determining the scope of their operations. This plan shall include provisions for a competitive process held at periodic intervals. Nothing in this section supersedes Section 1797.201.”

Riverside County is the second largest county in California, with 7,206 square miles in land area. It currently contains 12 primary zones, and 15 sub-zones. The largest of these zones is the Desert Zone, which encompasses nearly 62 percent of the entire county area.

The Abaris Group has previously defined three broad EOA zone configurations earlier in this report. The County should also continue to use separate compliance analysis zones (most of which will be consistent with the current EOAs). Further, the County should consider designating sub-zones for either monthly compliance analysis or as specific Performance Evaluation Zones. This is to ensure that the response time performance in smaller communities that are incorporated into compliance zones with major urban areas maintain a defined level of service, and that their response times are not simply lost in the much larger compliance analysis process, outlines the recommendations relative to the current zones.



Proposed Riverside County Ambulance Zones					
Zone Name	SubZones Included	Exclusive (Yes or No)/Provider	Average Monthly Response Volume	Recommendation	Adjustments
Central Zone	Central Unincorp. South, Moreno Valley	Yes/AMR	1,753	Maintain for compliance	Continue to use current sub-zones for monthly compliance
Desert Zone	Desert Unincorp., Palm Springs and Desert Hot Springs, La Quinta-Coachella, (and contains Coves Cities, Cathedral City, Indio City)	Yes/AMR	1,728	Maintain for compliance	Incorporate Indio and Cath. City into Desert Zone - Continue to use current sub-zones for monthly compliance
Northwest Zone	N. Norco/NW Unincorp., S. Corona/NW Unincorp., Riverside City	Yes/AMR	3,709	Maintain for compliance	Continue to use current sub-zones for monthly compliance
Pass Zone	None	Yes/AMR	713	Maintain for compliance	None
Mountain Plateau Zone	None (Idyllwild City Zones fall within)	Yes/AMR	82	Maintain for compliance - 2 to 3 month intervals	Reconsider compliance analysis time period
Southwest Zone	SW Unincorp 01, Murrieta-Temecula	Yes/AMR	2,379	Maintain for compliance	Continue to use current sub-zones for monthly compliance.
San Jacinto Valley / Hemet Zone	San Jacinto Unincorp., Hemet	Yes/AMR	1,667	Maintain for compliance	Continue to use current sub-zones for monthly compliance
Palo Verde Valley Zone	None	Yes/AMR, dba Blythe Ambulance	156	Maintain for compliance	Ensure "Immediate Dispatch" standard for "best effort" response grids
Idyllwild Fire Protection District (IFPD)	IFPD SubZones I, II and III	Yes/IFPD	49	Maintain for compliance - 2 to 3 month intervals	Reconsider compliance analysis time period
Cathedral City Zone	None	No/Cathedral City Fire Department	310	Incorporate into Desert Zone	Separate for Performance Evaluation Zone
Indio City Zone	None	No/RivCo Fire-Cal Fire	Unknown	Incorporate into Desert Zone	Separate for Performance Evaluation Zone
Coves Cities Zone	None	Yes/RivCo Fire-Cal Fire	Unknown	Maintain for compliance	None

Source: Riverside County EMS Plan, 2012 Draft Update, EMS Agency Response Statistics, Abaris Group Recommendations

Figure 3 - Proposed Riverside County Ambulance Zones

Performance Evaluation Zones would be defined as non-EOA, compliance zones. They are calculated on a periodic basis, as determined by the EMS Agency in coordination with the affected areas. Their purpose is to provide a more defined area of analysis that would not directly impact the contract compliance analysis process, but would be conducted to ensure that specific areas of the county are not being underserved from the standpoint of response time performance. The specific, required performance level would be negotiated and defined in the contract, and continued non-performance in these areas would trigger a mandatory system status plan evaluation and corrective action plan. These zones are typically designated at a response time compliance level of between 75 – 85 percent, depending on the negotiated process.



Current Riverside County EOAs and Non-exclusive Zones

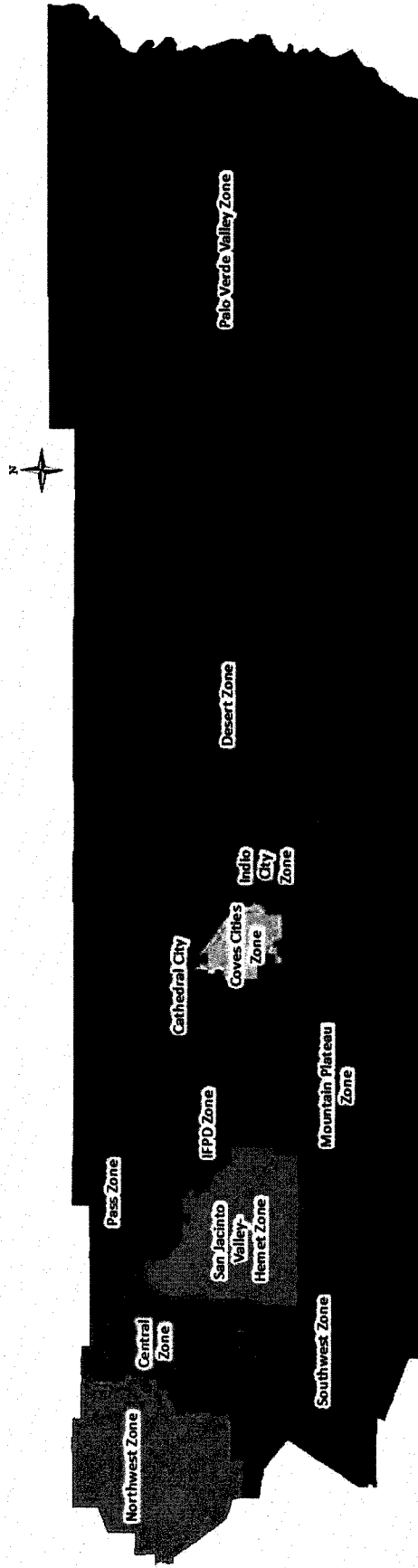


Figure 4 - Current Riverside County EOAs and Non-exclusive Zones

Cathedral City and Indio do not have exclusivity under H&S Code section 1797.224 and also do not qualify under 1797.201



Proposed Riverside County Response Time Compliance Zones and Qualified "201" Cities or Fire Protection Districts

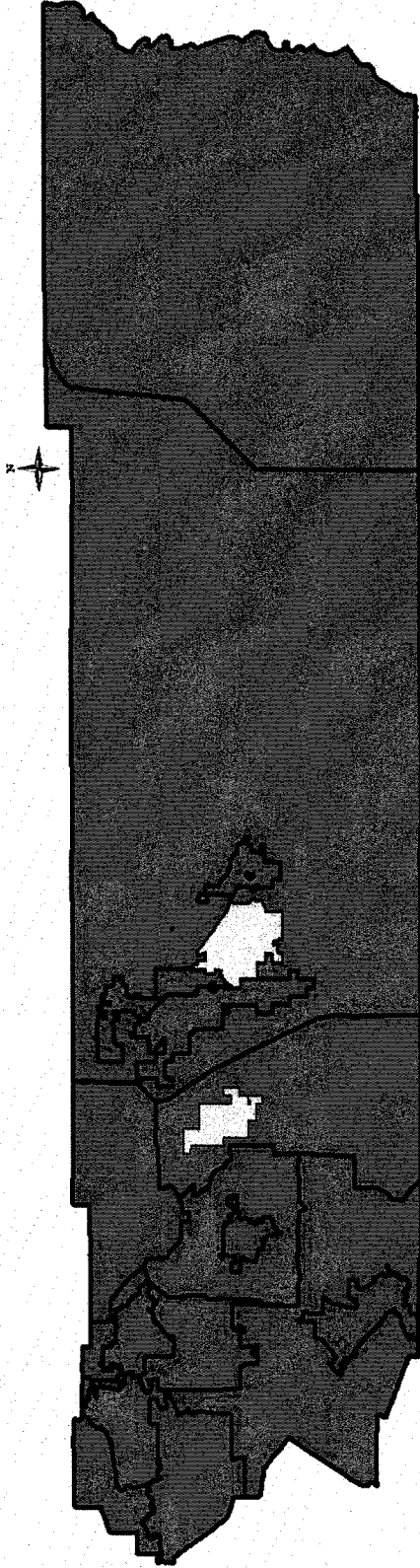


Figure 5 - Proposed Response Time Compliance Zones and Qualified H&S Code section 1797.201 Cities or Fire Protection Districts



Proposed Emergency Response Times

The following maps display recommended ALS ambulance response times maps.

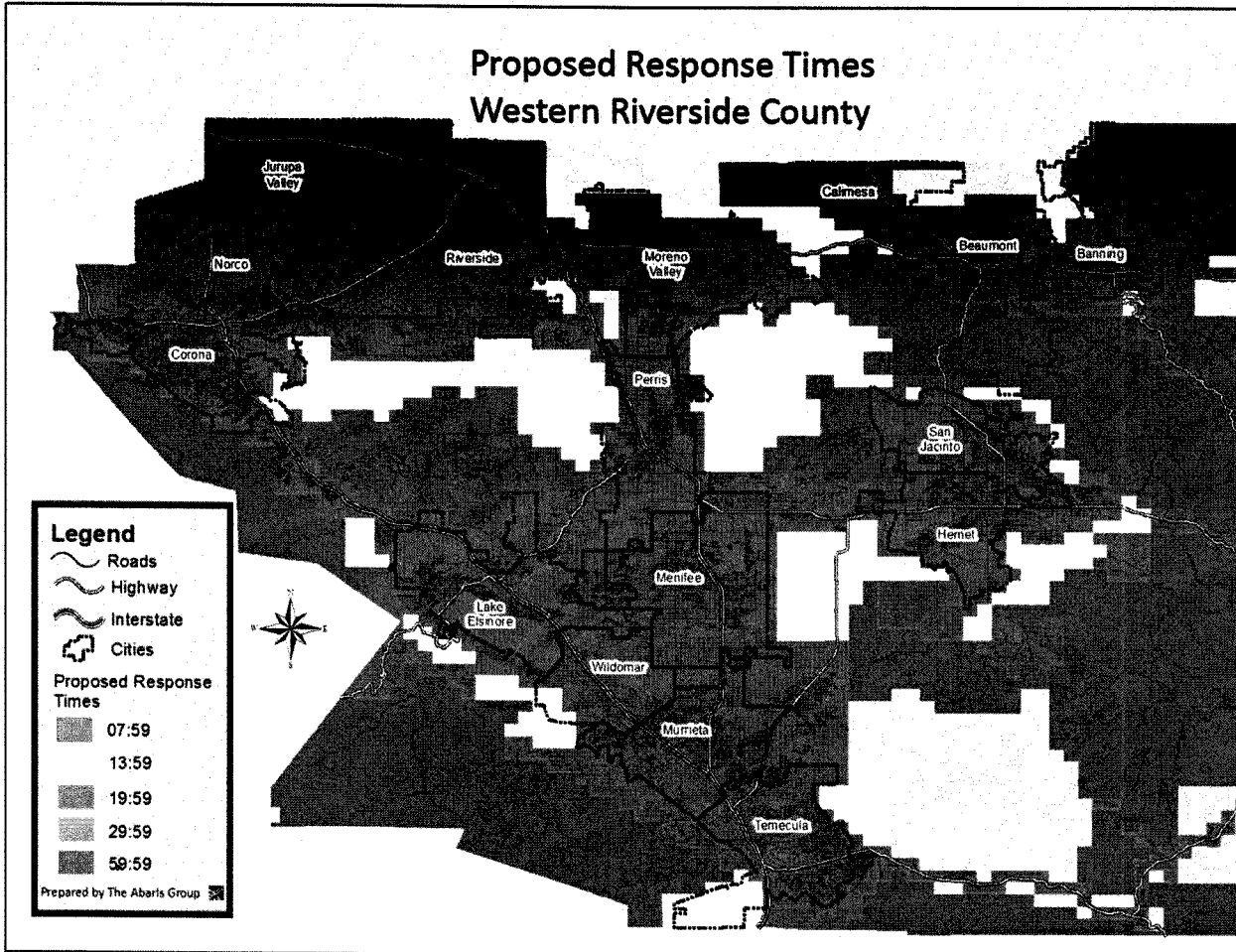


Figure 6 - Proposed Response Times - Western Riverside County

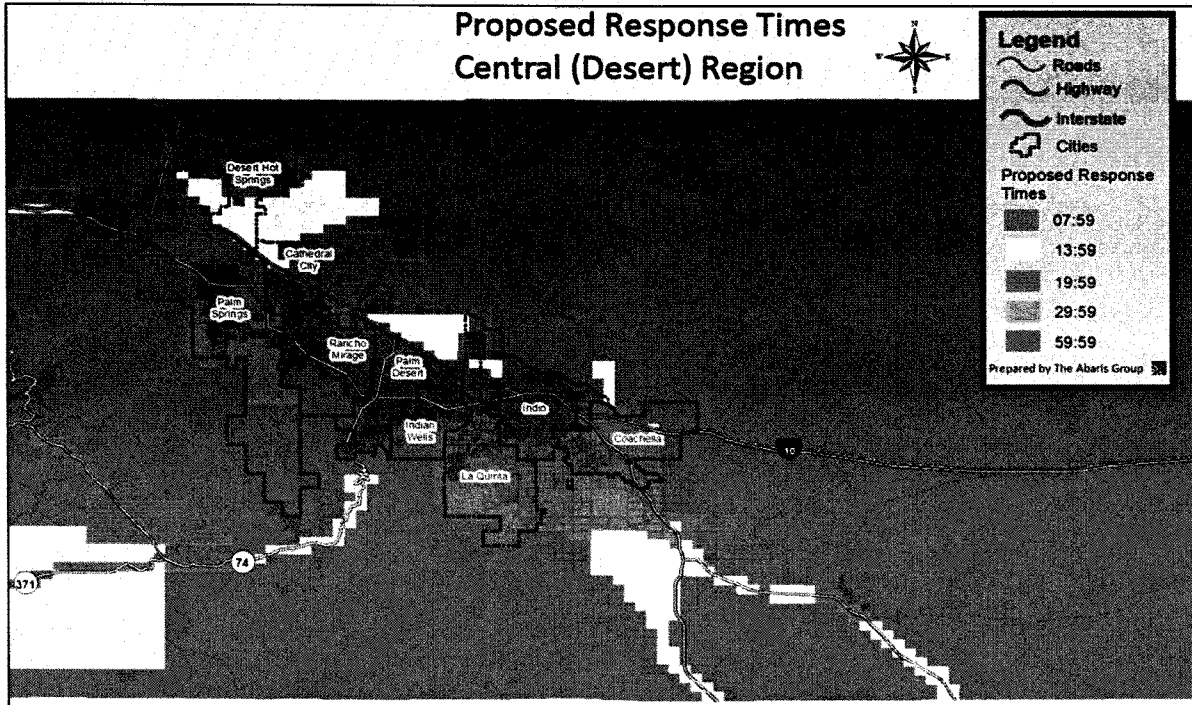


Figure 7 - Proposed Response Times - Central (Desert) Region

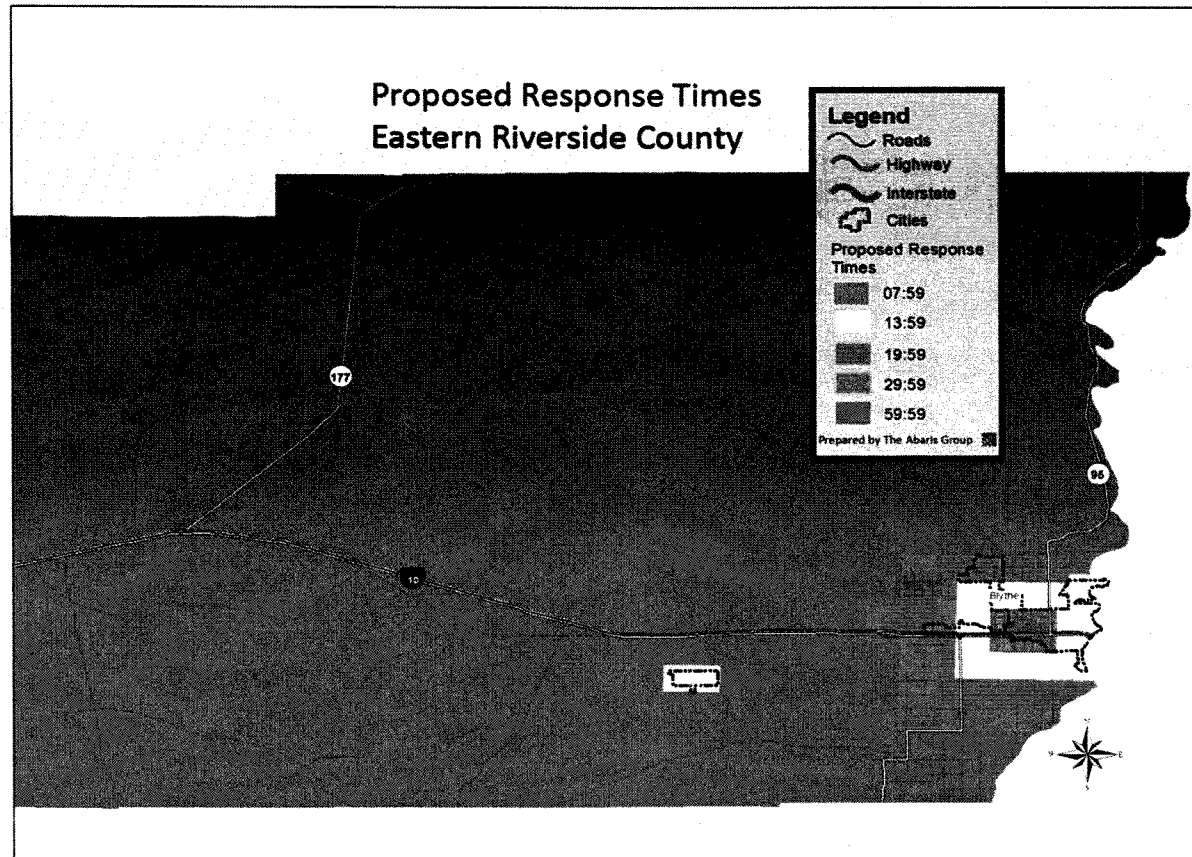
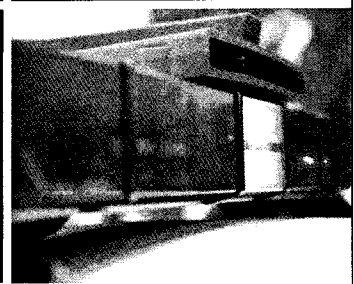
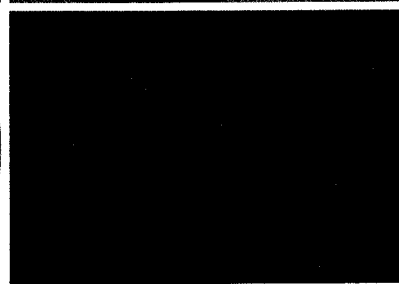
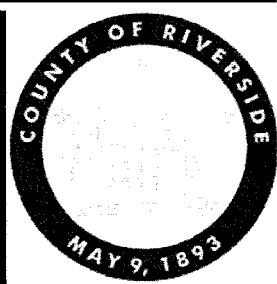
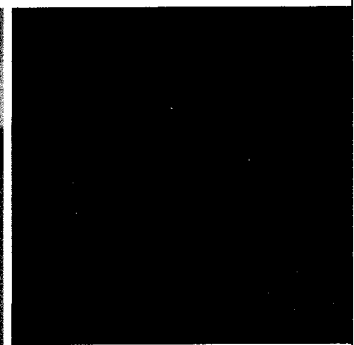
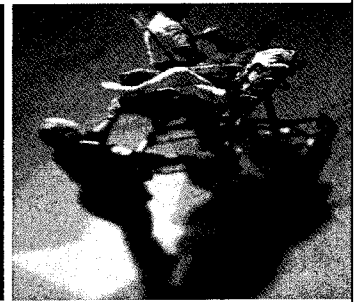
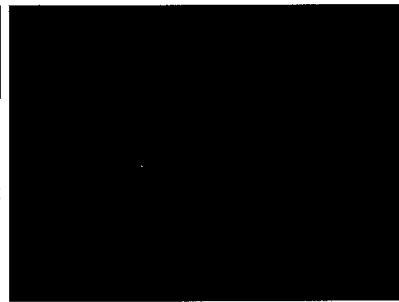
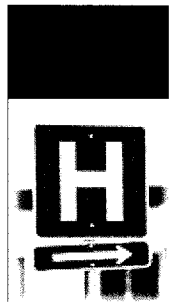


Figure 8 - Proposed Response Times - Eastern Riverside County



County of Riverside
 EMS Evaluation Report
 February 2014

Prepared for
 The Riverside County
 EMS Agency



by
 The Abaris Group
 Martinez, CA



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Executive Summary

Overview

The goal of the Riverside County Emergency Medical Services (EMS) system is to provide optimal, pre-hospital emergency medical care to all residents and visitors. The Riverside County Board of Supervisors has directed the Riverside County Emergency Medical Services Agency (REMSA) to undertake a comprehensive evaluation of the EMS system. The healthcare environment is changing dramatically and will continue to undergo many profound changes in the next decade. These changes, along with steadily increasing community needs for access to primary and emergency medical care, present many challenges as well as opportunities for innovation in the delivery of quality EMS service within the context of an integrated healthcare system. This comprehensive EMS system evaluation has been designed using an inclusive and collaborative process that will provide REMSA and the County Executive Office with recommendations for improving the EMS system. Riverside County has taken this proactive step to assure that the EMS system is meeting the needs of residents and visitors now and will continue to meet those needs into the future.

The Abaris Group was selected to conduct the EMS system evaluation, which includes development of an evaluation “As Is” report on the current EMS system. The Abaris Group’s EMS system recommendations, a scope of work for the County emergency ambulance contract and an EMS system strategic plan for implementation of the system improvements is provided under separate cover.

This report represents the Abaris Groups “As Is” evaluation of the current Riverside County EMS system.



System Review

The “As Is” evaluation and report outline the structure and function of the current EMS system design. In performing this evaluation and producing this report, The Abaris Group has evaluated all data, plans, financial reports, operational performance reports, regulatory requirements and other relevant documents pertaining to the current EMS system. The Abaris Group also conducted greater than 100 individual and focus group style interviews, performed direct field observations, visited hospitals and dispatch centers and held eight stakeholder group meetings to solicit input on the current EMS system. This “As Is” evaluation report outlines the specific findings on the current EMS system compiled during this process that began in November 2012.

The report’s components include evaluation of the following items:

<ul style="list-style-type: none">▪ Advanced life support programs (first responder and ambulance)▪ Ambulance performance for both 9-1-1 and inter-facility▪ Continuous quality improvement▪ Data collection and reporting▪ Emergency departments/hospitals and their EMS patient capacity▪ EMS communications and dispatch▪ EMS education and training	<ul style="list-style-type: none">▪ EMS first responder services and needs▪ EMS performance measures▪ Medical direction▪ Medical equipment and supplies▪ Operational integration and cooperative relationships of system participants▪ Public access, education and prevention▪ Specialty hospitals (i.e., trauma, pediatrics, stroke and heart)▪ Patient satisfaction and customer service
---	--



Acknowledgements

The Abaris Group would like to thank the Riverside County Board of Supervisors, the Riverside County Health and Hospital System, Public Health Department, and the Emergency Medical Services (EMS) Agency for the opportunity to partner with Riverside County as it identifies opportunities to improve the EMS system and the implementation of the strategic recommendations. Most importantly, The Abaris Group acknowledges all of the public and private EMS system stakeholders, who took the time to share their thoughts, opinions, and suggestions on how to serve the EMS needs of the people of Riverside County. The stakeholders demonstrated an exemplary level of commitment for the EMS system. The Abaris Group would also like to thank the members of the Steering Committee who provided valuable input to the evaluation and attended several meetings over the course of this evaluation.

In addition to performing approximately 100 interviews and attending a number of the EMS committee meetings, observation sessions were conducted with different EMS organizations, including ambulance crews and supervisors, County communication dispatchers, EMS specialists, and fire department first responders. Their input, combined with the experience of The Abaris Group's consultants, and data collected and analyzed form the basis for this report.

Participating Agencies & Providers

- Air Ambulance Providers
- Ambulance Association of Riverside County
- American Medical Response (AMR)
- Blythe Fire Department
- Calvary Ambulance
- Care Ambulance
- Cathedral City
- California Highway Patrol (Air Ambulance)
- City of Corona
- City of Corona Fire Department
- City of Eastvale
- City of Lake Elsinore
- City of Murrieta
- City of Norco
- City of Riverside Fire Department
- Coachella Valley Association of Governments
- County Service Area-38
- Emergency Medical Care Committee
- Hemet Valley Medical Center
- Helicopter EMS Continuous Quality Improvement (CQI)
- Hospital Association of Southern California
- Idyllwild Fire Protection District
- Loma Linda University Medical Center - Murrieta
- Morongo Tribe Fire Department
- Murrieta Fire Department
- Palm Springs Fire Department
- Pechanga Tribe Fire Department
- Paramedic liaison nurses
- Pre-hospital Medical Advisory Committee
- Public Health Emergency Preparedness and Response Branch
- Riverside City Police Department
- Riverside County Department of Mental Health
- Riverside County EMS Agency
- Riverside County Executive Office



A B A R I S G R O U P

- Riverside County Fire Chief's Association
- Riverside County Fire Department
- Riverside County Law Enforcement Administrators Association
- Riverside County Medical Association
- Riverside County Regional Medical Center
- Riverside County Sheriff's Office
- Rural/Metro Ambulance
- Trauma Audit Committee
- Trauma Program Managers
- Western Riverside Council of Governments



Project Overview

The current EMS system is meeting many of the needs of the almost 2.2 million Riverside County residents. The County has undergone significant population growth in the past decade. The demand for efficient, high quality, cost-effective emergency medical care is at an all-time high and will continue to increase EMS service demand in the foreseeable future. Additionally, both service and financial challenges anticipated under the Affordable Care Act (ACA) will require significant change within the healthcare system. The Community Health Profile released by the County of Riverside Department of Public Health (DOPH) outlines specific health risk factors and chronic diseases directly affecting County residents.

In response to these known challenges and challenges yet unforeseen, Riverside County has taken a proactive step with the initiation of this emergency medical services (EMS) evaluation. Through the EMS system evaluation process, the County of Riverside has invited EMS system stakeholders to participate in the redesign of the EMS system during this era of challenge, innovation and opportunity.

The EMS system evaluation and review is a comprehensive systems assessment to be completed during the term of the current County master ambulance service agreement. This evaluation will provide REMSA with recommendations for improving the EMS system including the current agreement for advanced life support (ALS) ambulance services. REMSA has employed an experienced consultant, The Abaris Group, to guide staff and EMS stakeholders through the evaluation process. The EMS system evaluation is being conducted using a four-pronged approach. This approach includes the use of an EMS System Evaluation Steering Committee, broad stakeholder group meetings, key informant interviews and stakeholder focus group interviews. This effort is an inclusive and transparent process; one that has obtained valuable input from stakeholders of the Riverside County EMS system. The EMS System Evaluation Steering Committee includes members appointed as representatives or designees from the Riverside County Board of Supervisors, Western Riverside Council of Governments (WRCOG), Coachella Valley Association of Governments (CVAG), the Riverside County Fire Chief's Association (RCFCA), the Hospital Association of Southern California (HASC), the Riverside County Medical Association (RCMA), and the Riverside County Law Enforcement Administrators Association (RCLEAA). Riverside County staff on the EMS Evaluation Steering Committee include the EMS Agency Director, the County Fire Chief, the Director of Public Health and a representative from the Executive Office, Department of Mental Health, County Sheriff's Office and Riverside County Regional Medical Center (RCRMC).

Broad stakeholders groups accessed during this evaluation include members of the greater Riverside County community including representatives from cities; ambulance providers; tribes; hospitals; education and training programs and institutions; skilled nursing facilities; law enforcement; mental health ; emergency medical care committee; field personnel such as firefighters, paramedics, emergency medical technicians, dispatchers; special districts such as community service areas and the public.

The Abaris Group has conducted key informant interviews and focus group interviews. The key informant interviews were conducted utilizing tools developed to gather information from community



leaders about their thoughts, interests, and needs as well as expectations about the process and future direction of the EMS system. Focus group interviews have also been conducted to gather additional information from community partners. The Abaris Group conducted meetings of stakeholder groups and used input received during those sessions to acquire an understanding of their organization or group needs.

Project Phase I

The initial phase of the EMS system evaluation includes three deliverables. The evaluation considers national and state guidelines and best practices for model EMS systems to benchmark the strengths and improvement opportunities current EMS system. Phase I findings and deliverables will be presented to the Board of Supervisors in March 2014.

Phase I activities and deliverables include:

1. Evaluation of the current EMS system and development of the “As Is” report including a review of the economics of Riverside County as it relates to the cost and funding of the EMS system.
2. Development of recommendations for system improvements to optimize patient outcomes within a feasible and stable cost/funding model. This also includes updating the EMS Transportation Plan to ensure optimal patient outcomes.
3. Development of a comprehensive Scope of Work (SOW) that can be used for the County’s Master Ambulance Contract.

Project Phase II

Phase II will build upon the results of Phase I. Deliverables for Phase II are an EMS system strategic plan and an associated implementation plan. The desired output of this planning process is a strategic plan that identifies the EMS system’s mission, vision, values, goals, and objectives and targets potential system innovations that may be achievable and that may be required with health reform for the Riverside County EMS system. Upon completion of the EMS system strategic plan, the final step of Phase II of the project will be to develop a comprehensive implementation plan for the EMS strategic plan. The implementation plan will address each phase of the approved strategic plan and include guidance for implementing each element of the plan.

Project Methodology

The Abaris Group conducted this project using a variety of tools and input processes. These included:

- Accessing and reviewing an extensive number of data sources.
- Conducting key informant and focus group interviews that ultimately exposed The Abaris Group to hundreds of EMS and hospital stakeholders.
- Conducting broad stakeholder meetings designed to solicit input from interested individuals and stakeholder groups.



- Conducting a variety of site visits and interviews with on-duty EMS field personnel, emergency department staff and dispatch center personnel.

In addition to an extensive team of experienced experts from The Abaris Group, this project received subject matter guidance from the 19-member EMS System Evaluation Steering Committee.

Stakeholder Groups

REMSA and The Abaris Group hosted a total of eight stakeholder meetings conducted during two time periods of the evaluation. This included Round One occurring February 2013 and Round Two during July 2013. The meetings were held at geographically strategic locations throughout the County. There were a total of 205 stakeholders who participated. The purpose of these meetings was to introduce the evaluation to stakeholders and to obtain input on the EMS system evaluation and the future of the EMS delivery system. The following is a combined snapshot from the different meetings of what was expressed.



Project Summary

“As Is” Evaluation and Report Key Findings

Empirically, based upon analysis of the available data, the Riverside County EMS system is materially meeting the current emergency medical care needs of residents and visitors. There are emergency medical capacity, performance and financing challenges that are identified in detail throughout this “As Is” evaluation report. System improvement opportunities and enhancements to address these issues will be addressed in the EMS system improvement document. Anecdotally, during the initial evaluation focus group interviews and broad stakeholder meetings, most stakeholders present indicated that the current system is performing well and generally meeting expectations.

While there are many elements of the current EMS system that are working well, there are many opportunities to improve the EMS delivery system. There also appears to be a strong community and stakeholder desire to continue to enhance the EMS system to meet current healthcare challenges and prepare in the anticipation of the Patient Protection and Affordable Care Act (PPACA or ACA otherwise known as “Health Reform” in this report) and other anticipated healthcare changes.¹ The new healthcare delivery system of the future will emphasize accountability and value and move away from the current paradigm of payments that are now largely driven based on services delivered. Some of these key opportunities are related to ambulance and first-response performance standards, EMS dispatch, EMS and emergency department (ED) mental health bottlenecks, hospital capacity challenges, data integration and outcome measures and continuous quality improvement (CQI) initiatives.

Key findings that are explored in detail within this report include (non-prioritized):

- There is a single private ambulance provider for the majority of the County – American Medical Response (AMR).
- AMR is meeting response-time requirements for all of their service zones as set forth in the current Master Agreement for ALS Ambulance Services.
- The current Master Agreement for ALS Ambulance Services response-time requirements and definitions are not consistent with national/state guidelines and contain a permissive list of exemptions.
- Response-time penalties as set forth in the Master Agreement for ALS Ambulance Services are not as stringent as those established by other counties with more contemporary performance-based agreements.
- With the exception of the Mountain Plateau Zone, all emergency ambulance service exclusive operating areas (EOAs) and response zones are reasonably balanced based upon population, generation of fee-for-service revenue and response-time performance.

¹ Pub.L. 111-148, 124 Stat. 119, to be codified as amended at scattered sections of the Internal Revenue Code and in 42 U.S.C.



- The Cities of Indio and Cathedral City are identified in the County EMS plan as non-exclusive ambulance operating areas.
- REMSA continues to have dialogue with the State EMS Authority (EMSA) over the status of the Mountain Plateau and Pass ambulance EOAs as identified in the current EMS plan.
- With the exceptions of the cities of Hemet, Blythe, and Calimesa, all communities within the County have fire-department based first-responder ALS services.
- There are currently two public-private partnership agreements within the EMS system, one between the City of Riverside and AMR and a second between the City of Corona and AMR. Parties to these agreements continue to voice satisfaction with these partnerships.
- REMSA, base hospitals and some pre-hospital providers have collectively implemented programs to create and maintain a continuous quality improvement (CQI) focus.
- There is an established network of hospitals along with pre-hospital protocols for cardiac (ST-elevated myocardial infarction – STEMI), trauma, and pediatric care demonstrating a substantial commitment to patients that require these specialized services.
- Increasing demand for primary and emergency medical care has created ED crowding issues with the system.
- Ambulance patient off-load delays at the hospitals are a significant system problem.
- The system currently utilizes a decentralized model for on-line medical direction and patient distribution through six different base hospitals.
- Dedicated EMS communication systems for medical control, patient distribution and disaster medical coordination are outdated and currently pending improvement with the Riverside County Public Safety Enterprise Communications (PSEC) project.
- There is exceptionally good working relationship amongst all stakeholders including committee involvement and task force participation (e.g., recent comprehensive ALS protocol revisions).
- Emergency medical dispatch (EMD) is in use in the Cities of Corona and Riverside and in all Riverside County Fire Department service areas. These programs are effectively providing lifesaving instructions over the phone simultaneously while EMS responders are en-route to the emergency and have future expansion potential as well.
- EMD coverage is not 100 percent (estimated at 93 percent) across the County.
- With the exception of the City of Riverside, EMD-based resource triage and prioritization is minimally utilized in the system.
- All ambulances and most first-responder apparatus are dispatched as an emergency response (i.e., lights and siren), regardless of EMD-call determinant.
- EMS mutual and automatic-aid agreements are out of date and in some areas missing.
- There is currently no uniform system standards, contemporary screening, clear definitions or reporting of first responder, non-emergency or inter-facility transfer (IFT) response times in the County EMS Plan.
- Individual EMS provider agencies have implemented a wide variety of training programs but conduct much of their training independently.
- Expanding requirements for data collection, analysis, reporting and information sharing continue to greatly increase the demand for new technology and staffing to support CQI activities.



- EMS equipment is not standardized across all EMS providers.
- Equipment and supply cost-reimbursement for ALS first responders varies.

Broad Stakeholder Group Meeting Feedback

Round One Meeting

During the Round One stakeholder sessions, an overview of the project was provided and input was solicited for follow-up interviews and stakeholder groups. Three key questions were asked by the consultants who facilitated these meetings.

The first question asked was “What works well with the current EMS delivery system”

The responses varied but many stated the 9-1-1 works well and overall EMS response times were working well. Others stated there was a sense of “community” within the different departments – between fire and EMS and much collaboration among hospitals and good communication. Many stated that “field” care was excellent.

The second question was “What does not work well?”

Again, there was varied commentary on this question. There was definitely a bias towards more of a “regional” approach to EMS with a number of participants suggesting by those speaking at these meetings that there were many “silos” with local delivery systems, agreements and even contracting terms that did not imply a true regional EMS delivery system. There was a strong sense that all providers should be on the same electronic medical record and a lack of clarity on whether that will really happen in the community. A substantial issue with many providers and their leaders was the lack of patient feedback on patient outcomes once EMS patients are transported to the EDs. There was some commentary made to have the need for more liberal use of air medical services from some of the air medical providers in attendance. Many agreed that roles could be expanded for paramedics and that care options being used across the country as well as alternative destinations for patients (e.g., urgent care centers, clinics, etc.) should be investigated. This would allow timely care of the patient and enable crews to get back in the system more quickly. The prevalent issue was the described “wall time” for EMS patients waiting to be off-loaded from an ambulance to the ED with many expressing frustration with excessive times as well as the number of ambulances that are delayed in their off-load times.



The third question was “What ‘vision’ do you see for the EMS system?”

- Public awareness is missing. How do we educate the public? Is it EMS’s responsibility? It is a tough call.
- There is a need for a two-track system – one for mental health and another for medical patients.
- It is important to have a single, countywide standard for EMD throughout the County and to regionalize dispatch facilities.
- Mutual aid for EMS needs improvement. Fire mutual aid is great and the same is needed for EMS.
- One cannot only look at EMS discreetly because it is broken. Improved stakeholder education is needed. One must include elder services, social/mental health organizations in the broad level of care, since EMS is the default healthcare provider.
- Access to mental healthcare was described as “bad.”

Round Two Meetings

The Abaris Group conducted a second series of stakeholder meetings throughout Riverside County in order to give stakeholders a first-hand look at the evaluation’s initial data and to obtain interim evaluation input. The stakeholder meetings were held in July of 2013 in Riverside, Temecula, Palm Desert and Banning. There were a total of 115 stakeholders who attended this second round of meetings. Several Steering Committee members were in attendance at the different locations.

Each stakeholder meeting had a specific written agenda where attendees were introduced to the EMS evaluation taking place in Riverside County. The Abaris Group then gave an overview of the evaluation’s progress before going into the details and findings of the project. The overview included evaluation progress, data on demand and forecasts, capacity measures, current and predicted payer mix, observations and topic areas, and EOA options and comparisons. The presentation was immediately followed by a group discussion, which was stimulated by questions from The Abaris Group. Stakeholders had the opportunity to voice their opinions and ask questions on issues regarding the EMS system and the evaluation. During the second round of stakeholder meetings, attendees brought up many issues and questions.

After a group discussion, the next steps of the evaluation were presented and discussed by REMSA. It was noted that, at the conclusion of the project, the Board of Supervisors will determine options for the EMS delivery system and ambulance zoning. The Board is expected to make this determination by June 2014.

Other Stakeholder Input

Riverside County Fire Chief’s & EMS Officer’s Position Paper

In a May 13, 2013 EMS position paper for this evaluation, the Riverside County Fire Chiefs’ Association affirmed its support for fire-based pre-hospital EMS as a primary mission objective delivered by the fire departments of Riverside County.



Key topics discussed in their position paper included the need for:

- EMS medical director
- EMS communications and interfaces
- Regionalized medical control and direction
- Pre-hospital system improvement fee structure
- Designing an outcome/performance-based system
- EOA realignment and reevaluation
- Performance standards for the hospitals
- Use of basic life support (BLS) ambulance resources
- Local EMS agency (LEMSA) structure and funding

The County Fire Chiefs and EMS Officers indicated that they support this EMS evaluation and await the evaluation's outcome and look forward to being actively involved in the final design of EMS response and transport in Riverside County.

American Medical Response Input – July 2013

AMR indicated, through their submitted input document, they would prefer not soliciting outside bids but to use the Phase II portion of the project as a vehicle to negotiate system changes and upgrades as are warranted as identified in this evaluation.

Specifically, AMR recommends a process that would address desired system enhancements without introducing the uncertainty and expense of the RFP process. AMR believes that to “utilize the excellent work that was done through the third party EMS consultant” would assure that the current system is meeting or exceeding contractual requirements. Using this system evaluation as the framework, the County would be assured of a reliable and proven provider and can then focus on the system changes that will provide Riverside County with the enhancements that best meet the needs of all stakeholders. This collaborative process will allow for the inclusion of evidence-based enhancements while maintaining good fiscal policy by exercising cost-benefit discussions including the stakeholders that typically cannot be done through a traditional RFP process.

The amended contract would include annual system reviews to ensure that Riverside County meets its obligation under good public governance to assure that the provider of services is doing a good job and is meeting or exceeding expectations. For each year that the provider demonstrates compliance, it would be granted an additional year of services under the contract. In this manner, the contractor earns the right to the marketplace on an annual basis increasing the level of scrutiny.



Other Relevant Pending Policy

Assembly Bill 678 – Enhanced Public Ambulance Medi-Cal Payment Synopsis

In October 2011, the Governor of California signed Assembly Bill 678 (AB 678).² This legislation enables public agencies that provide ground emergency medical transportation services to receive supplemental payments for Medi-Cal patients transported. Public agencies include those “owned or operated” by the state, counties, cities, fire departments, and some districts. Because the bill states “own or operate,” there is a potential opportunity for any public agency that has a direct cost related to 9-1-1 ambulance service, such as purchasing ambulance transports from a private contractor, to take advantage of the supplemental reimbursement. The objective is to increase the payment relative to the actual cost of providing the service. Supplemental payments will not be available where the Centers for Medicare & Medicaid Services (CMS) has contracted with local or county entities to offer Medi-Cal HMO plans.

The California Department of Health Care Services (DHCS) has been working on the actual implementation details and submitted a final payment methodology plan to CMS on July 1, 2013. CMS has up to 90 days to approve or deny it; however, DHCS shared draft plans with CMS and refined the final version to expedite the process.

Once approved, eligible public agencies will receive supplemental reimbursement based on the average transport cost less any Medi-Cal payments, copayments, or related grant funding; this is defined as the uncompensated cost. Fifty percent of that amount will be paid by DHCS through CMS funding to remain revenue neutral to the State of California General Fund. The average transport cost is different for every provider and a beta committee of public agencies was formed to test different approaches to determine a cost report. This committee attempted to include first responder EMS costs, although this was rejected by CMS and is not part of the final plan. The final cost reporting formula will not be shared publicly until CMS approves the plan. However, the cost report will require the use of audited financial data.

Supplemental Reimbursement Formula
Average transport cost times number of Medi-Cal transports <i>Less: Medi-Cal payments</i> <i>Medi-Cal copayments</i> <u><i>Related grant funding</i></u>
Uncompensated cost

The financial benefit to public agencies is directly related to the Medi-Cal transports provided. DHCS has estimated the amount of supplemental reimbursement this will offer at \$160 million for fiscal year 2013/14 (covers retroactive payments to 2010, approximately \$39.1 million annualized). These estimates will change based on cost report data that will be requested after CMS approves the plan. This program is retroactive to January 30, 2010 and there will be an initial influx of revenue. New 9-1-1 ambulance public agency providers would be eligible for the supplemental reimbursement based on the AB 678 language.

² http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0651-0700/ab_678_bill_20111002_chaptered.pdf



AB 678 Details

- Approved October 2011, retroactive to 1/30/2010
- For the period being claimed, an eligible provider must be
- A provider of ground emergency medical transportation services
- Enrolled as a Medi-Cal provider
- Owned or operated by the state, a city, county, city and county, fire protection district, special district, community services district, healthcare district, or a federally recognized Indian tribe
- Supplemental reimbursement equals the federal financial participation based on the payment methodology approved by CMS, but cannot exceed 100 percent of the actual costs
- Revenue neutral to the California State General Fund
- Has the potential to affect cost reimbursement to three fire ambulance providers in Riverside County (Idyllwild Fire Protection District, Riverside County Fire Department and Cathedral City Fire Department)



Healthcare and the Emergency Medical Services Environment

Healthcare is undergoing unprecedented changes and will continue to undergo these changes for the next ten years with a particular emphasis on the next three to five years. The healthcare paradigm is changing and, while the population is aging, most care is expected to be provided in outpatient settings. Those patients who are admitted to the hospital will be of higher acuity. This shift has driven the growth of specialty hospital centers. Hospital admissions have already begun to drop in the state and the country and increasingly in the future, hospital admissions will likely be sicker patients who cannot be cared for in outpatient settings.

Health Reform, the Patient Protection and Affordable Care Act (PPACA or ACA, referred to as “Health Reform” in this report) as well as other anticipated healthcare changes offer an unprecedented opportunity to *rethink, revitalize and reform* Riverside County’s EMS delivery system.^{3,4} The healthcare delivery system of the future will emphasize accountability and value over the current paradigm, which is primarily based on payments for services delivered. Many of these concepts are being applied to EMS services, are being tested, and validated throughout the nation.

These factors and others plus a stronger role for technology will lead to fewer but higher-acuity hospital admissions. Hospitals and their physician providers are under increased pressure to lower unnecessary utilization and are now under payment incentives to reduce unnecessary and expensive services. Value and outcomes-based payment models that are not merely paying for the delivery of services but looking for the “value” of these services have not included EMS delivery services to date.

To absorb the expected influx of up to 250,000 newly insured Riverside County residents anticipated under Health Reform beginning in 2014, the community must address the reality that EMS delivery services will be increasingly vulnerable to economic and other forces. In addition, they will be too expensive and likely inadequate to meet the changing needs of a “value-driven” delivery system for the future of Riverside County.⁵

Provisions of Health Reform have already begun (e.g., health coverage expansion for populations such as young adults, reduction of lifetime insurance payment benefit caps, eliminating pre-existing conditions exclusions, and expanded payment for wellness services) and will significantly expand over the next three to five years. Foremost, is the increase in coverage that is expected to drive down the rates of uninsured patients. In states like California, where current rates are high, this may drop to perhaps as few as five percent of the population by 2019. This will result in an increase in the number of insured either through a health exchange or Medi-Cal product. While this will have a profound impact on the number of insured, the method to pay for this coverage will largely come from approximately \$780

⁴ <http://www.ihi.org/explore/TripleAim/Pages/default.aspx>

⁵ Insure the Uninsured Project Analysis, 2012



billion in proposed Medicare payment reductions mostly through reductions in unnecessary services and a push to outpatient and home-health services. In California alone, these reductions are estimated to be \$60 billion with the impact in Riverside County estimated at approximately \$2.6 billion.⁶

There are many unknowns in Health Reform and their impact on the EMS and emergency care industry. These unknowns include how many newly insured eligible will not seek health coverage and thus accept modest penalties. For those newly insured that obtain coverage, how many will purchase very high deductible plans and thus limit their coverage for first-line services such as emergency care.

Key to these Medicare reductions is the elimination of waste. The Institute of Medicine recently estimated waste at 30 percent of healthcare spending in 2009 or \$750 billion.⁷ Medicare has largely ignored EMS systems with these latest rounds of cost cutting and incentive/disincentive payments, but this is likely to change in the future. The need to have EMS inclusion in the early development of the value-driven payment models of the future is a key factor for systems like Riverside County to explore a system evaluation and strategic planning process to prepare for the future.

There are many initiatives, including those for EMS delivery systems, being trialed across the country that are designed to evaluate and limit waste, redundancy, and unnecessary services. Care coordination and alignment of incentives are large topics for this area, including the concept of Accountable Care Organizations (ACOs).⁸ To date, EMS delivery systems have not been a substantial part of these initiatives but will be in the future.

⁶ Book, R., Ramlet, M. *“What is the Regional Impact of Medicare and Medicare Advantage Payment Reductions”*, University of Minnesota, September 2012

⁷ Institute of Medicine: *“Best Care at Lower Cost: The Path to Continuously Learning Health Care in America”* (Sept. 6, 2012)

⁸ <http://www.accountablecarefacts.org/?gclid=CO-ZwsGjtrMCFUlxQgodP2sA4Q>



County Demographics

Overview

Riverside County, part of the Inland Empire, is the second largest county in terms of area among Southern California counties. According to the US Census Bureau, in 2010 Riverside County had a population of 2.2 million people.

Figure 1 shows the population among selected Southern California counties between the 2000 and 2010 censuses.

The population of Riverside County

grew by 41.7 percent, with an annual growth rate of 4.2 percent. This was the largest percentage of growth compared to the other Southern California counties. The annual growth rate in Riverside County was also well above that of California, which was one percent per year.

County	2000	2010	Percent Change	Average Annual Change
Imperial	142,334	174,528	22.6%	2.3%
San Bernardino	1,709,479	2,035,210	19.1%	1.9%
San Diego	2,813,839	3,095,313	10.0%	1.0%
Orange	2,846,282	3,010,232	5.8%	0.6%
Los Angeles	9,519,315	9,818,605	3.1%	0.3%
Southern California Total	18,576,569	20,323,529	9.4%	0.9%
California	33,871,653	37,253,956	10.0%	1.0%
United States	281,424,600	308,745,538	9.7%	1.0%

Source: US Census Data 2000, 2010

Figure 1 - Population of Southern California Counties, 2000-2010

Region	2010	2015	2020	2010-2020 Change	Average Annual Change
Riverside County	2,192	2,351	2,593	18.3%	1.8%
California	37,309	38,801	40,644	8.9%	0.9%
United States	309,326	321,363	333,896	7.9%	0.8%

Source: US Census Bureau, 2012, CA Department of Finance, 2013

Figure 2 - Population Projections

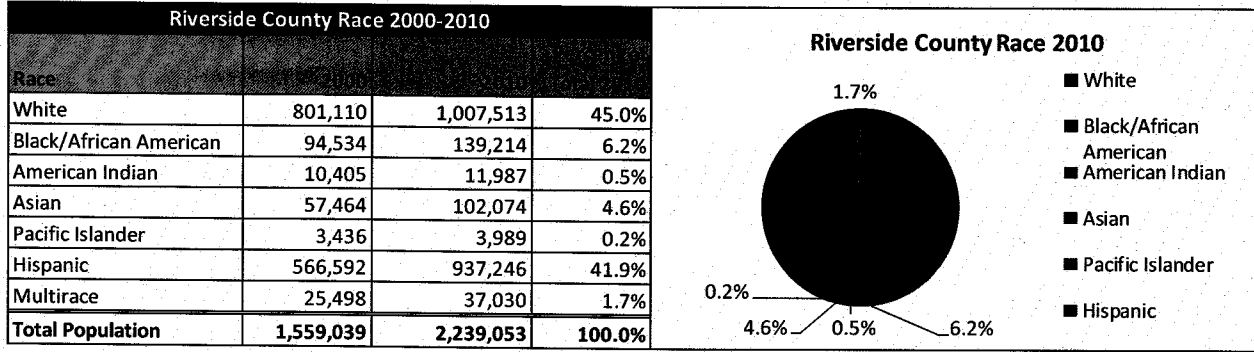
The California Department of Finance projects the Riverside County population to increase by 18.3 percent from 2010-2020 or 1.8 percent annually (Figure 2). Figure 3 shows that the fastest growing city between 2000 and 2010 was Beaumont; Murrieta was second and increased from 44,282 residents to 103,466 residents (13.4 percent increase). Palm Springs grew the least among cities in the county at 0.4 percent annually.

Four of the 28 cities were incorporated after the year 2000: Menifee (2008), Eastvale (2010), Wildomar (2010) and Jurupa Valley (2011); which make up 14.1 percent of the incorporated population.

City	2000	2010	Percent Change	Average Annual Change
Beaumont	11,384	36,877	223.9%	22.4%
Murrieta	44,282	103,466	133.7%	13.4%
Perris	36,189	68,386	89.0%	8.9%
San Jacinto	23,779	44,199	85.9%	8.6%
Lake Elsinore	28,928	51,821	79.1%	7.9%
Coachella	22,724	40,704	79.1%	7.9%
Temecula	57,716	100,097	73.4%	7.3%
Blythe	12,155	20,817	71.3%	7.1%
La Quinta	23,694	37,467	58.1%	5.8%
Desert Hot Springs	16,582	25,938	56.4%	5.6%
Indio	49,116	76,036	54.8%	5.5%
Moreno Valley	142,381	193,365	35.8%	3.6%
Hemet	58,812	78,657	33.7%	3.4%
Rancho Mirage	13,249	17,218	30.0%	3.0%
Indian Wells	3,816	4,958	29.9%	3.0%
Banning	23,562	29,603	25.6%	2.6%
Corona	124,966	152,374	21.9%	2.2%
Cathedral City	42,647	51,200	20.1%	2.0%
Unincorporated Area	420,721	504,392	19.9%	2.0%
Riverside	255,166	303,871	19.1%	1.9%
Palm Desert	41,155	48,445	17.7%	1.8%
Norco	24,157	27,063	12.0%	1.2%
Calimesa	7,139	7,879	10.4%	1.0%
Canyon Lake	9,952	10,561	6.1%	0.6%
Jurupa Valley	N/A	95,004	N/A	N/A
Menifee	N/A	77,519	N/A	N/A
Eastvale	N/A	53,668	N/A	N/A
Wildomar	N/A	32,176	N/A	N/A
Riverside County	1,545,320	2,189,641	41.7%	4.2%

Source: US Census Data 2000, 2010

Figure 3 - Population Riverside County Cities



Source: State of California, Department of Finance, 2011

Figure 4 - Riverside County Race 2000-2010

As depicted in Figure 4, the largest population in terms of race in Riverside County for the decade 2000-2010 was White (45 percent), followed by the Hispanic race, which comprised 41.9 percent of the population.

Figure 5 shows race projections for Riverside County up to 2020. The California Department of Finance projects that by 2020, Hispanics will be the major race in Riverside County, comprising of 46.2 percent of the population. Whites are projected to be 40.2 percent of the population. Blacks would be the third largest population in terms of race, making up six percent of the population.

Riverside County Race Projections, 2020			
Race	2010	2020	Percent of Total 2020
White	1,007,513	1,166,730	40.2%
Black/African American	139,214	173,095	6.0%
American Indian	11,987	15,956	0.5%
Asian	102,074	156,097	5.4%
Pacific Islander	3,989	4,635	0.2%
Hispanic	937,246	1,343,019	46.2%
Multirace	37,030	45,316	1.6%
Total Population	2,239,053	2,904,848	100.0%

Source: State of California, Department of Finance

Figure 5 - Race Projections, 2020

Sex and Age 2011			
Sex	Riverside County	California	United States
Male	49.8%	49.7%	49.2%
Female	50.2%	50.3%	50.8%
Age	Riverside County	California	United States
< 5 years	7.3%	6.7%	6.5%
5-18 years	27.8%	24.6%	23.7%
18-65 years	52.9%	57.0%	56.5%
> 65 years	12.0%	11.7%	13.3%

Source: U.S. Census Bureau, 2013

Figure 6 - Sex and Age Demographics, 2011

Figure 6 shows that the male population in Riverside County in 2011 was 49.8 percent while the female population was 50.2 percent. Both of these figures are similar to those of California and the US. Riverside County has a younger population (i.e., those less than 18 years of age) than California and the US.



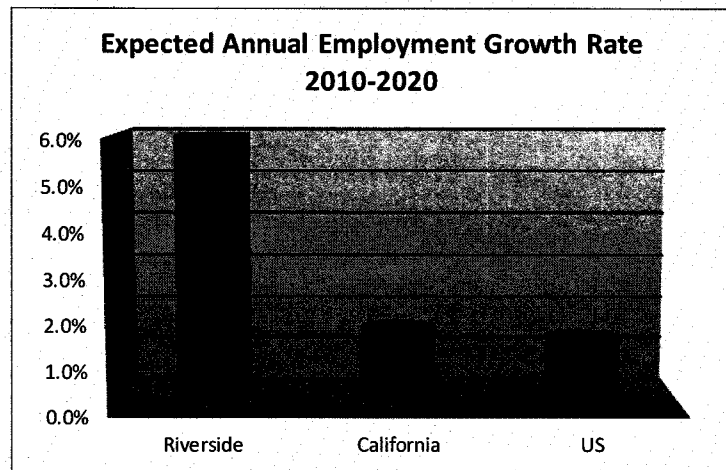
Household Income 2011	
County	Median Income
Santa Clara	\$84,741
Marin	\$78,470
Orange	\$72,046
San Diego	\$59,290
Los Angeles	\$52,239
San Bernardino	\$51,017
Imperial	\$36,898
California	\$57,275
United States	\$50,502

Source: U.S. Census Bureau, Small Area Income and Poverty Estimates

Figure 7 - Household Income by California County 2011

As shown in Figure 7, Riverside County’s median household income in 2011 was \$52,491, which was similar to other selected Southern California counties (Orange County and San Diego County had higher household incomes). However, in 2011 Riverside County was below the average median household income in California (\$57,275) and above the median of the US (\$50,502).

According to the Southern California Association of Governments, Riverside County’s expected annual employment growth rate for the 2010-2020 is expected to be six percent. According to the US Bureau of Labor Statistics, the annual employment growth in California is expected to be 1.6 percent while the national rate is expected to be 1.4 percent.



Sources: Southern California Association of Governments 2013, Bureau of Labor Statistics, 2012

Figure 8 - Expected Annual Employment Growth Rate, 2010-2020



Riverside County Population Projections for Jurisdictional Boundaries - Highest Annual Change					
City	2010	2015	2020	Percent Change 2010-2020	Average Annual Change
Calimesa	7,879	11,369	14,858	88.6%	8.9%
Coachella	40,704	55,437	70,170	72.4%	7.2%
Desert Hot Springs	25,938	34,720	43,502	67.7%	6.8%
Beaumont	36,877	46,706	56,534	53.3%	5.3%
Banning	29,603	35,899	42,195	42.5%	4.3%
Lake Elsinore	51,821	61,185	70,548	36.1%	3.6%
Wildomar	32,176	37,325	42,474	32.0%	3.2%
San Jacinto	44,199	49,643	55,086	24.6%	2.5%
Indio	76,036	83,760	91,484	20.3%	2.0%
Perris	68,386	75,207	82,028	19.9%	2.0%
Eastvale	53,670	57,566	61,461	14.5%	1.5%
Norco	27,063	28,910	30,757	13.6%	1.4%
Temecula	100,097	106,168	112,239	12.1%	1.2%
Riverside	303,871	321,424	338,977	11.6%	1.2%
Riverside County	2,189,641	2,392,450	2,595,259	18.5%	1.9%

Source: US Census Bureau, 2010, Riverside County Projections, 2010

Figure 9 - Population Projections for Jurisdictional Boundaries - Highest Annual Change

Figure 9 shows the highest annual change of expected population by jurisdictional boundary in Riverside County. There are ten incorporated cities that are projected to increase at a faster rate than Riverside County as a whole (1.9 percent). The city of Calimesa is expected to increase by the largest amount (88.6 percent) over the ten-year period (2010-2020) with an average annual growth rate of 8.9 percent. The City of Riverside, the most populous city in the county, is expected to reach almost 340,000 residents by 2020 making its annual growth rate 1.2 percent.

Figure 10 shows the lowest annual change of expected population by jurisdictional boundary in Riverside County. The unincorporated areas are projected to decrease in population by 6.5 percent over the ten-year period (or a decline of 0.7 percent annually). Corona is expected to increase by an average 0.2 percent per year through 2020, making it the slowest increasing city in the County.

Riverside County Population Projections for Jurisdictional Boundaries - Lowest Annual Change					
City	2010	2015	2020	Percent Change 2010-2020	Average Annual Change
Unincorporated	504,392	487,930	471,467	-6.5%	-0.7%
Corona	152,374	154,096	155,818	2.3%	0.2%
Murrieta	103,466	106,405	109,343	5.7%	0.6%
Palm Desert	48,445	50,272	52,098	7.5%	0.8%
Hemet	78,657	81,757	84,856	7.9%	0.8%
Blythe	20,817	21,743	22,668	8.9%	0.9%
Rancho Mirage	17,218	18,003	18,788	9.1%	0.9%
Jurupa Valley	95,004	99,359	103,714	9.2%	0.9%
Palm Springs	44,552	46,745	48,938	9.8%	1.0%
Canyon Lake	10,561	11,085	11,609	9.9%	1.0%
Indian Wells	4,958	5,208	5,458	10.1%	1.0%
Moreno Valley	193,365	203,552	213,739	10.5%	1.1%
Menifee	77,519	81,746	85,973	10.9%	1.1%
La Quinta	37,467	39,545	41,623	11.1%	1.1%
Cathedral City	51,200	54,117	57,034	11.4%	1.1%
Riverside County	2,189,641	2,392,450	2,595,259	18.5%	1.9%

Source: US Census Bureau, 2010, Riverside County Projections, 2010

Figure 10 - Population Projections for Jurisdictional Boundaries - Lowest Annual Change



Figure 11 below shows the population projections by age for Riverside County. The last column shows that residents older than 65 will comprise 17.2 percent of residents by 2030. The exact impact of having a larger elderly population is not known; however, one can surmise that the healthcare and EMS systems will be utilized more.

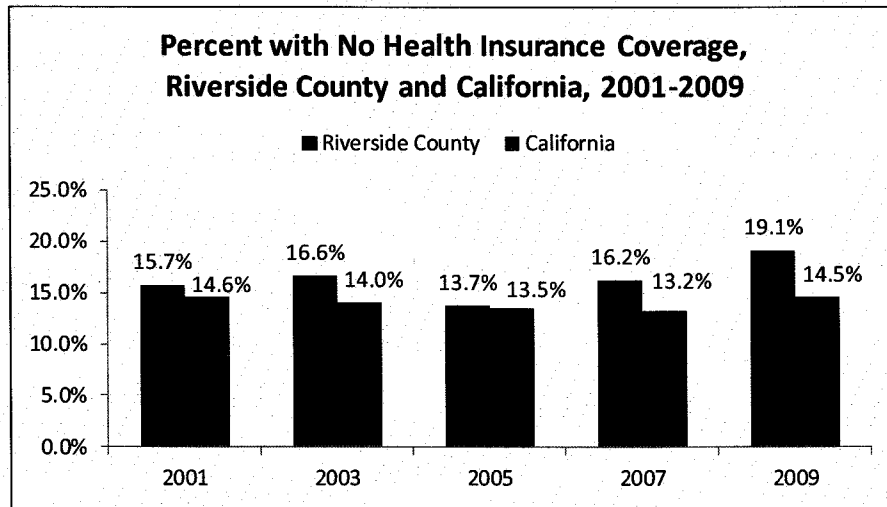
Riverside County Population Projections by Age									
Year	Total (All ages)	Preschool Age (0-4 years)	School Age (5-17 years)	College Age (18-24 years)	Working Age (25-64 years)	Young Retirees (65-74 years)	Mature Retirees (75-84 years)	Seniors (85 or more years)	Percent of residents older than 65
2010	2,191,886	161,015	456,708	229,438	1,085,465	141,046	85,793	32,421	11.8%
2020	2,593,211	180,466	463,859	277,359	1,307,888	207,255	111,484	44,901	14.0%
2030	3,046,064	205,821	523,902	282,717	1,509,527	290,890	168,807	64,399	17.2%

Source: State of California, Department of Finance, 2013

Figure 11 - Riverside County Population Projections by Age

Health Insurance

According to the California Health Interview Survey (CHIS), the percentage of residents in Riverside County without health insurance coverage rose from 15.7 percent in 2001 to 19.1 percent in 2009. In contrast, the number of California residents without health insurance remained generally unchanged between 2001 and 2009.



Source: CHIS, 2009

Figure 12 - Percent with No Health Insurance Coverage, Riverside County and California, 2001-2009



Emergency Care & Hospital Data/Projections

The following is a summary of key emergency care data related to the capacity and demand of emergency care services in Riverside County.⁹

Emergency Medical Services – Overview

All ambulance providers responded to a total of 172,700 9-1-1/ALS responses in 2012 with 136,271 patients transported (79.9 percent of responses resulted in transport). The majority of EMS activity in Riverside County is provided by American Medical Response (AMR). In 2012, AMR (including Blythe) responded to 152,051 calls and transported 121,663 patients (80 percent) to Riverside County hospitals.¹⁰

Riverside County - 2012 EMS Data		
Provider	Responses	Transports
AMR	150,194	120,169
Riverside County Fire (Indio & Covas)	15,303	10,898
Cathedral City	3,729	2,529
AMR/Blythe	1,857	1,494
Idyllwild FPD	672	425
Total	171,755	135,515

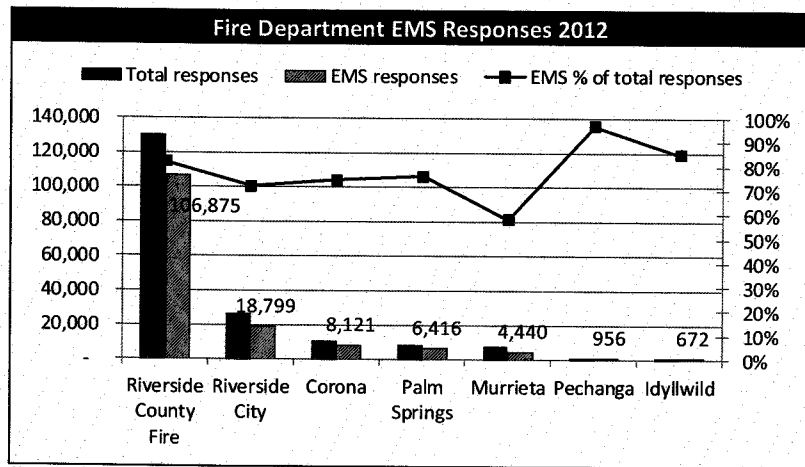
Note: Data is for emergency calls

Source: Riverside County EMSA, The Abaris Group FD Survey, April 2013

Figure 13 - Riverside County - 2012 EMS Data

Fire Department Responses

The Abaris Group conducted a survey in April 2013 of the fire departments in Riverside County and their EMS response times. Of the fire departments that responded to our survey (n=7), Riverside County Fire Department had the most total responses, 130,620, of which 106,875 were EMS responses. About 82 percent of Riverside County Fire Department's total responses were



Note: Numbers displayed on graph are EMS responses only. Data might be better presented if details were known on the urban/suburban - rural area differences between response time, which was not available during this survey process.

Source: The Abaris Group Fire Department Survey, April 2013

Figure 14 - Fire Department EMS Responses, 2012

⁹ Certain projections on volume and capacity need are made in this report that are based on historical utilization trends. Should key patient utilization management models be instituted, these projections would need to be updated.

¹⁰ Charts depicting the number of EMS frequent users are pending for this report.



EMS responses.

The fire departments that operate in Riverside County vary in their measures of response time. Response time is defined according to the dispatch chart of variable time slots provided by The Abaris Group (See Appendix A). Some measure response times as T1-T7 (see Appendix A) while others measure from T5-T7.

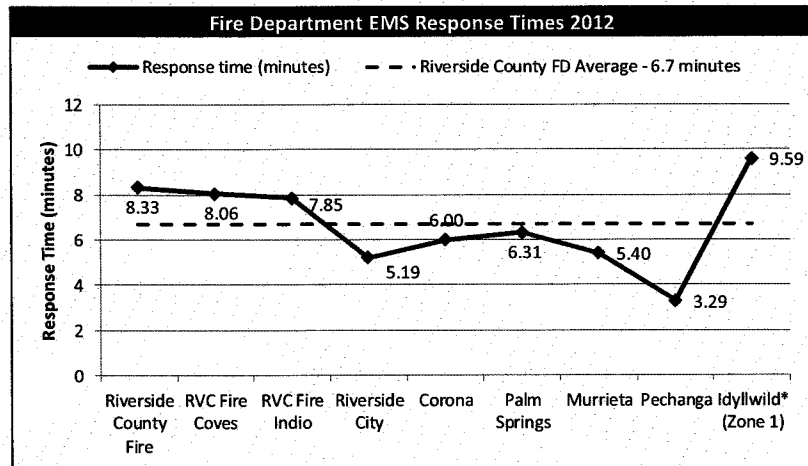


Figure 15 - Fire Department EMS Response Times, 2012

When compared to the average for fire departments in Riverside County (calculated by averaging the response times provided from the survey), there are four fire departments that are above the overall average of the fire departments of the County.

Not all fire departments have a response-time performance standard. Of those that have a response-time standard, there is much variability and no agency routinely reports their performance publically.

Fire Department EMS Response Times 2012					
FD	Response time (minutes)	Is this an "average" response time?	Response-time performance standard	Measure of response time (using The Abaris Group dispatch chart T1 - T12)	
Riverside County Fire	8.33	Yes	None	T1-T7	
RVC Fire Covas	8.06	Yes	None	T1-T7	
RVC Fire Indio	7.85	Yes	None	T1-T7	
Riverside City	5.19	Yes	5:00 minutes 90% of incidents	T5-T7	
Corona	6.00	No	6 minutes 85% of the time	T5-T7	
Palm Springs	6.31	Yes	None	T2-T7	
Murrieta	5.40	Yes	6:30 from receipt of alarm	Response time is from the point crews are notified of a call and includes turn-out time and response.	
Pechanga	3.29	Yes	5 minutes	T5-T7	
Idyllwild* (Zone 1)	9.59	Yes	Response parameters are held to less than 9.59 minutes	IFPD Response times are calculated from the time of notification of a 911 call to the time of arrival on scene.	

Note: Riverside County Fire average response time aggregate includes extremely large rural areas.

Data might be better presented if details were known on the urban/suburban - rural area differences between response time, which was not available during this survey process.

*Idyllwild has 3 different zones and response times and standards vary for each zone. Zone 1 was used because it has the lowest/fastest response time.

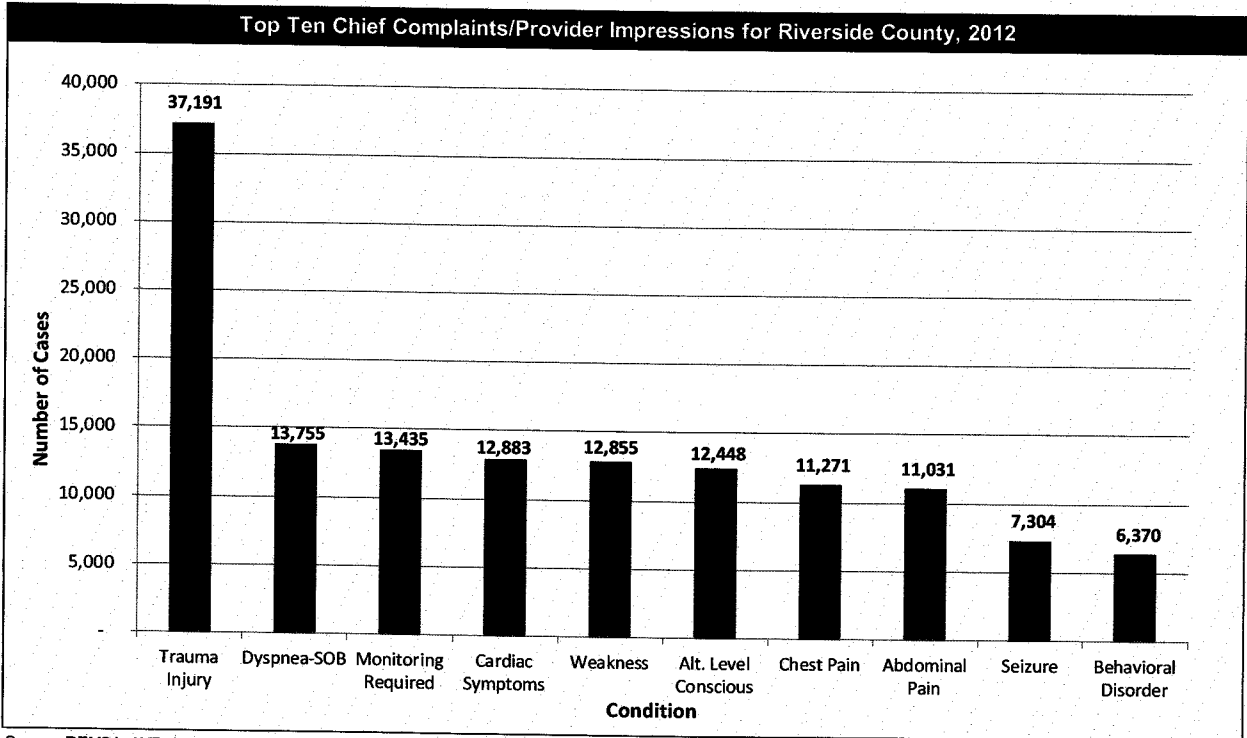
Source: Riverside County FDs and The Abaris Group analysis. Survey conducted April 2013

Figure 16 - Table of Fire Department EMS Response Times, 2012



EMS Patient Categories

The ten most frequent EMS patient categories or “impressions” for Riverside County in 2012 are displayed in the figure below. Trauma injury was the most common case and comprised of 37,191 cases in 2012. The next most frequent case was Dyspnea-short of breath (SOB), which had 13,755 cases in 2012.



Source: REMSA, AMR data, 2013

Figure 17 - Top Ten Chief Complaints/Provider Impressions for Riverside County, 2012



Hospital Emergency Departments - Overview

There are 16 hospitals in Riverside County with emergency departments (EDs). In 2011, these 16 hospitals received 688,760 ED visits (Figure 18). In total, there are 394 ED treatment stations (i.e., ED beds). The largest ED is at Riverside Community Hospital (50 beds), followed by Kaiser Permanente Riverside Medical Center (42 beds). However, Riverside County Regional Medical Center is the busiest ED in the County, with 92,626 visits in 2011 (39 beds).

Riverside County ED Visits, Treatment Stations, and AMR Emergency/ALS Transports							
Hospital	ED Visits (2011)	ED Treatment Stations	ED Visits per Station	AMR Transports (2011)	AMR Transports (2012)	Percent Change (2011-2012)	Percent AMR of all ED Visits
Riverside County Regional Medical Center	92,626	39	2,375	12,604	13,706	8.7%	13.6%
Riverside Community Hospital	75,785	50	1,516	17,136	18,455	7.7%	22.6%
Eisenhower Medical Center	64,571	41	1,575	4,460	4,753	6.6%	6.9%
Desert Regional Medical Center	59,781	28	2,135	10,303	10,787	4.7%	17.2%
Hemet Valley Medical Center	45,765	24	1,907	14,636	15,080	3.0%	32.0%
Parkview Community Hospital Medical Center	43,846	14	3,132	6,231	6,463	3.7%	14.2%
Corona Regional Medical Center-Main	42,622	19	2,243	6,918	7,117	2.9%	16.2%
Rancho Springs Medical Center	39,264	30	1,309	7,579	7,577	0.0%	19.3%
Kaiser Fnd Hosp - Riverside	39,226	42	934	5,629	5,577	-0.9%	14.4%
Inland Valley Medical Center	38,537	36	1,070	8,301	9,316	12.2%	21.5%
John F Kennedy Memorial Hospital	36,817	12	3,068	3,406	3,534	3.8%	9.3%
San Geronio Memorial Hospital	32,263	10	3,226	5,712	6,094	6.7%	17.7%
Kaiser Fnd Hospital - Moreno Valley	29,030	12	2,419	2,994	2,958	-1.2%	10.3%
Loma Linda University Medical Center-Murrieta	19,140	19	1,007	2,061	3,906	n/a**	10.8%
Menifee Valley Medical Center	18,987	12	1,582	5,527	4,846	-12.3%	29.1%
Palo Verde Hospital	10,500	6	1,750	1,551	1,494	-3.7%	14.8%
Riverside County Total	688,760	394	1,748	115,048	121,663	5.7%	17.7%
California Total	12,075,139	7,165	1,685	n/a	n/a	n/a	n/a

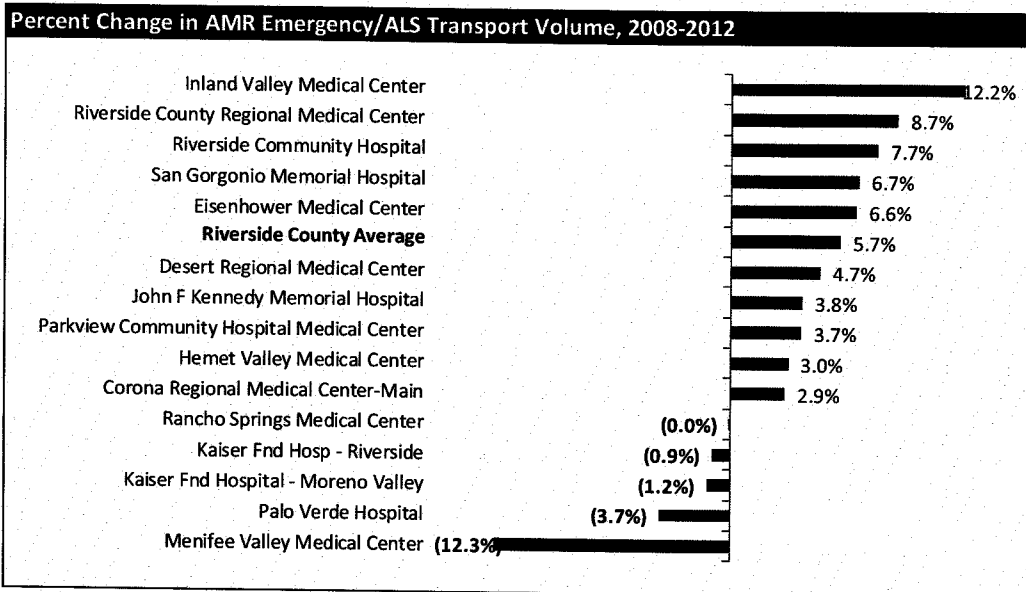
Notes: The number of ED treatment stations shown does not show other treatment space outside their licensed ED capacity that may be used by hospitals. Palo Verde Hospital did not report 2011 ED data to OSHPD. 2010 data used as substitute. Loma Linda University Medical Center-Murrieta opened 4/15/2011 and may have affected the volume of transports to Menifee Valley Medical Center and Rancho Springs Medical Center.

Sources: OSHPD Hospital Annual Utilization Data, 2011; Riverside County EMS Ambulance ED Wait Time Data; Blythe Compliance data

Figure 18 - Riverside County ED Data

Emergency Ambulance Transports

Riverside County’s primary ground ambulance provider, AMR (including Blythe), transported 121,663 patients in 2012 – an increase of 5.7 percent from 2011. AMR ground transports increased the most at Inland Valley Medical Center (+12.2 percent) and declined the most at Menifee Valley Medical Center (-12.3 percent). AMR transported most often to Riverside Community Hospital (18,455 transports). Other ground ambulance providers in the County (i.e., Riverside County Fire Department, Idyllwild Fire Protection District, and Cathedral City) transported 13,852 patients to area hospitals in 2012. This accounts for approximately 10 percent of the total ground ambulance transport volume.



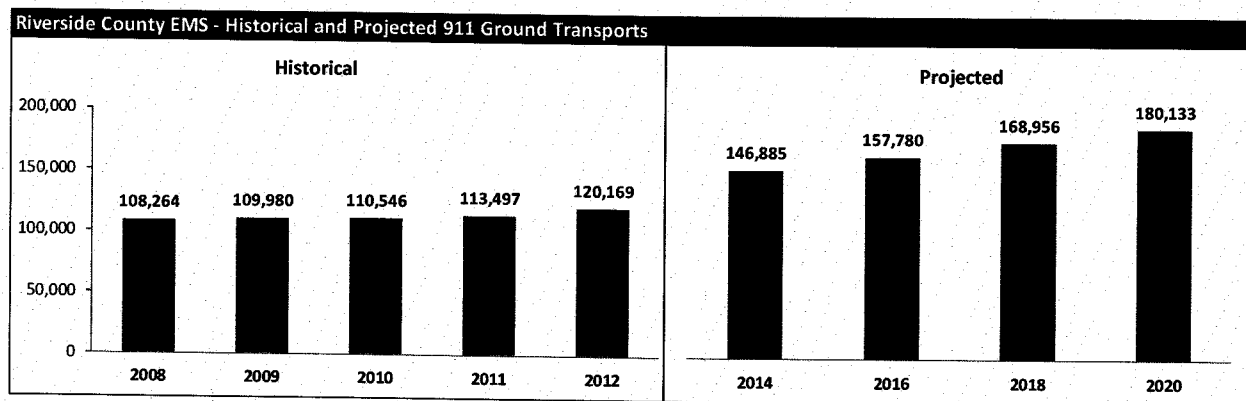
Source: Riverside County EMS Ambulance ED Wait Time Reports & Blythe compliance time data, 2011-2012

Figure 19 - Percent Change in AMR Emergency/ALS Transport Volume, 2008-2012

Emergency Medical Services (EMS) and Emergency Department (ED) Projections

EMS 9-1-1 Transport Projections

The EMS transport projection is calculated from historical EMS data from 2008 to 2012 and population projections by the California Department of Finance. EMS transports are projected to increase to 180,133 emergency transports by 2020, an increase of 32 percent between 2012 and 2020.

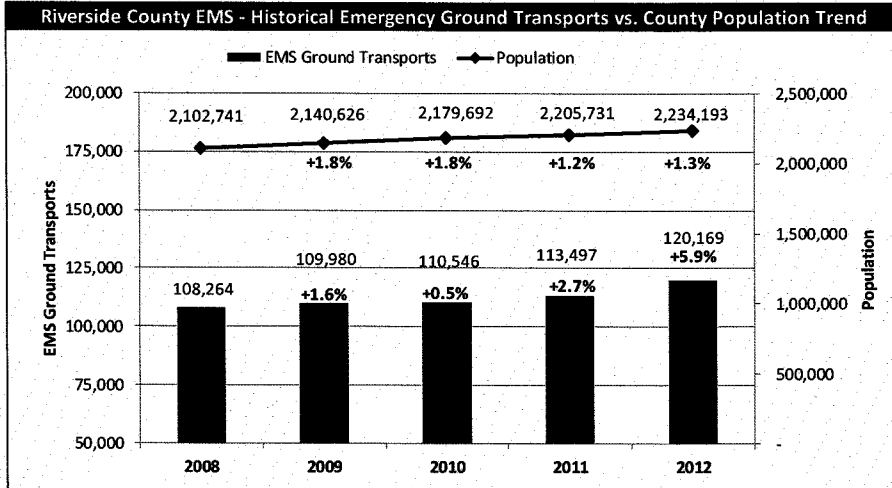


Note: Historical data does not include any non-AMR transports or Blythe Ambulance transports. Projections include all 9-1-1 transports.
Source: REMSA, The Abaris Group, 2013

Figure 20 - Riverside County EMS Historical and Projected Transports



Although the population of Riverside County has been increasing at 4.2 percent per year¹¹ between the years 2000-2010, recent population estimates suggest that growth has slowed (1.6 percent per year, 2008-2012). Despite reductions in population growth, EMS ground transports have been increasing at a higher rate than population trends for 2011 and 2012. Figure 21 plots historical emergency ground transports against the County population trend.



Note: Historical data of EMS transports from 2008-2012 does not include any non-AMR transports or Blythe
Sources: REMSA, CA Department of Finance, 2013

Figure 21 - Riverside County Historical Emergency Ground Transports vs. County Populations

ED Visit Projections

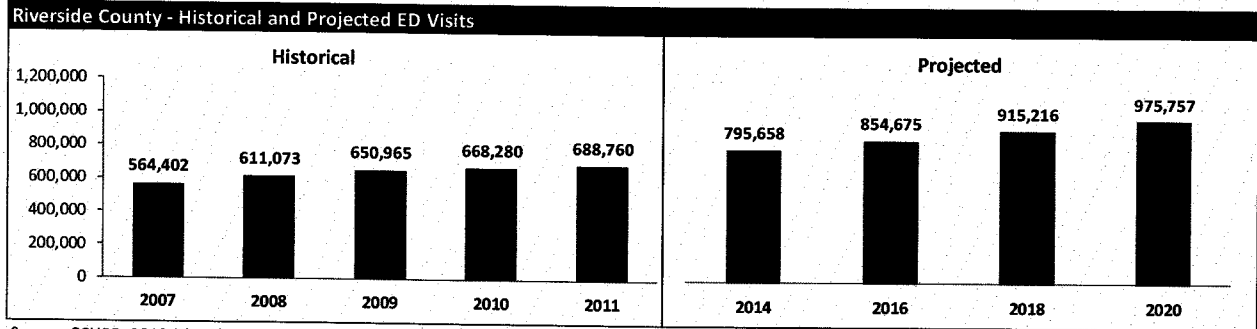
The ED visit projection is calculated using historical ED data from 2007 to 2011 and population projections by the California Department of Finance. ED visits are projected to increase to 975,757 visits by 2020, an increase of 32.2 percent between 2012 and 2020. The ED projection assumes that ED utilization will not be significantly impacted by the Patient Protection and Affordable Care Act (PPACA). This assumption is based on the findings of Chen et al., who concluded that the Massachusetts Health Reform of 2006 did not impact (positively or negatively) ED utilization.¹² However, there is some variability of thinking in the literature on this subject. As such, The Abaris Group considered all of the cited articles in the assumptions on ED projections. One article suggests ED demand could decline as a result of better access to primary care,¹³ and another suggests that ED use could increase due to lack of access in other settings.¹⁴

¹¹ US Census data

¹² Chen C, Scheffler G, Chandra A. Massachusetts' Health Care Reform and Emergency Department Utilization. *New England Journal of Medicine*. 2011;110907140018030.

¹³ Smulowitz PB, Lipton R, Wharam JF, et al. Emergency Department Utilization after the Implementation of Massachusetts Health Reform. *Annals of Emergency Medicine*. 2011;58(3):225-234.e1.

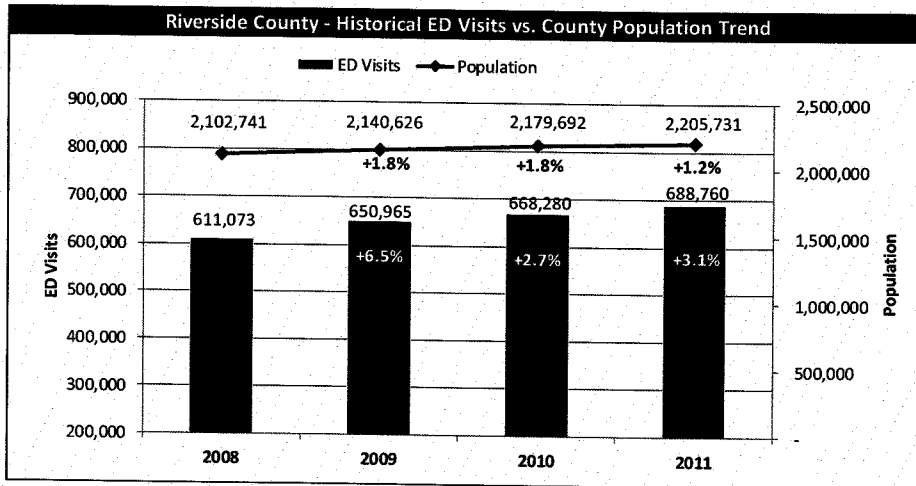
¹⁴ Goodman J. What Will Happen To Emergency Room Traffic? *Health Affairs Blog*. July 12, 2010 <http://healthaffairs.org/blog/2010/07/12/what-will-happen-to-emergency-room-traffic/>



Source: OSHPD, 2013, The Abaris Group, 2013

Figure 22 - Riverside County Historical and Projected ED Visits

When comparing recent population estimates to historical ED visits, Figure 23 shows that the ED visit growth rate was higher than the growth rate for population, 2008-2011. This suggests that population growth cannot be the only driving factor of increasing ED visits.

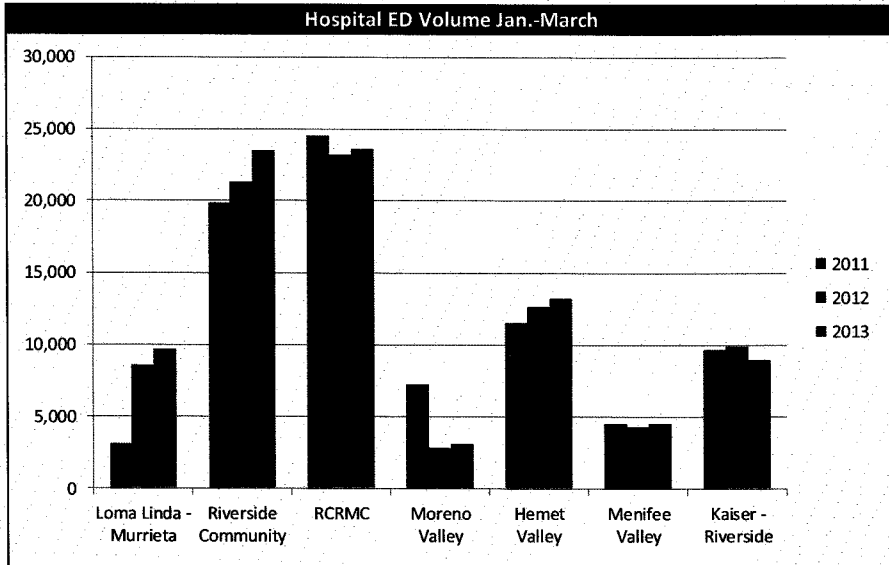


Sources: CA Department of Finance, 2013, OSHPD Annual Utilization Data 2008-2011

Figure 23 - Riverside County Historical Visits vs. County Population

Hospital Volume

A survey conducted by The Abaris Group in April of 2013 asked hospitals for ED volume data for 2012 and 2013, the data is displayed in Figure 24. When compared to ED volume in 2011, ED volume in 2013 (January through March) was higher for four of the seven hospitals that responded to the survey. In general, there was an increasing trend in ED volume from 2011 to 2013 (January through March).



Note: 2011 Jan.-March volume is estimated from 2011 total volume. Data displayed includes hospitals that responded to The Abaris Group Survey only.

Source: OSHPD, 2013, The Abaris Group Hospital Survey, April 2013

Figure 24 - Hospital ED Volume January to March 2011

Hospital Utilization

Between 2007 and 2011, ED utilization rates in Riverside County were lower compared to California and the US. As shown in Figure 25, ED utilization has been rising at the County, state and national levels.

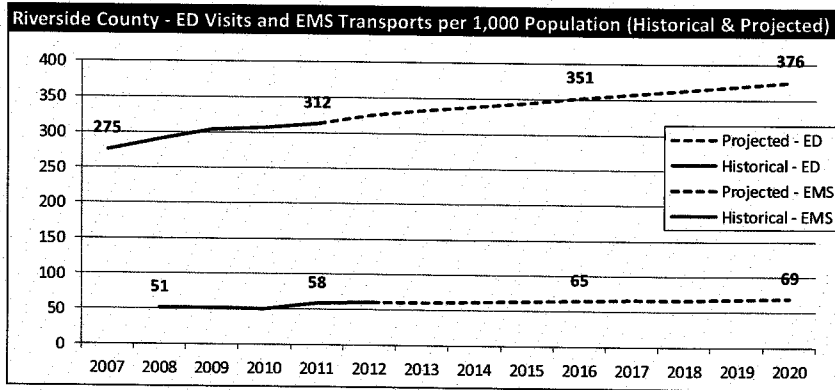
US, California and Riverside County ED Utilization Rates 2007 - 2011									
Year	US			California			Riverside County		
	Population (thousands)	ED Visits (thousands)	ED Utilization Rate	Population (thousands)	ED Visits (thousands)	ED Utilization Rate	Population	ED Visits	ED Utilization Rate
2007	301,231	116,802	387.7	36,553	10,403	284.6	2,049,902	564,402	275.3
2008	304,094	123,761	407.0	36,856	10,927	296.5	2,102,741	611,073	290.6
2009	306,772	136,072	443.6	37,077	11,702	315.6	2,140,626	650,965	304.1
2010	309,350	129,843	419.7	37,309	11,809	316.5	2,179,692	668,280	306.6

Sources: US Population: US Census Bureau, Office of Employment & Population Statistics
 US ED visits: Centers for Disease Control and Prevention, National Health Statistics Reports, National Hospital Ambulatory Medical Care Survey: Emergency Department Survey (Various Years)
 Riverside County population: State of California, Department of Finance, 2013
 CA population: State of California, Department of Finance, E-7. California Population Estimates, with Components of Change and Crude Rates, July 1, 1900–2012, December 2012
 CA ED visits: OSHPD Annual Utilization Data (various years)
 Riverside County ED visits: OSHPD, 2013

Figure 25 - ED Utilization Rates 2007-2011



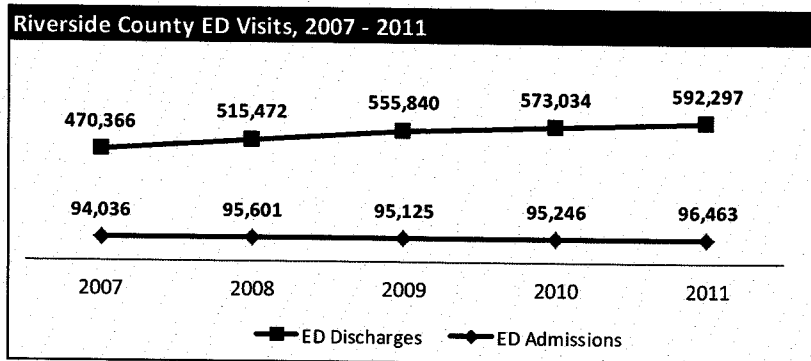
ED utilization is projected to increase to approximately 376 ED visits per 1,000 population between 2010 and 2020. This is up from 312 ED visits per 1,000 in 2011. EMS utilization is projected to increase to 69 transports (ALS/emergency) per 1,000 population by 2020. This increase is up from 58 transports per 1,000 in 2011 (Figure 26).



Source: State of California, Department of Finance, 2013, California Department of Finance population projections, OSHPD utilization data, The Abaris Group, 2013

Figure 26 - Riverside County ED Visits and EMS Transports- Historical and Projected

The historical growth in ED visits has primarily been driven by the increase in visits that are treated and released (ED discharges) as opposed to those ED visits that are admitted to the hospital (i.e., ED admissions). Between 2007 and 2011, the number of ED discharges increased by a total of 25.9 percent while ED admissions only increased by 2.6 percent.



Source: OSHPD Annual Utilization Data, 2007-2011

Figure 27 - Riverside County ED Discharges and Admissions

The ED admission rate, defined as the percentage of ED visits that were admitted to the hospital, declined from 16.7 percent in 2007 to 14.0 percent in 2011. As a result of this declining trend, the ED admission rate in Riverside County (14.0 percent) is now below the statewide average (15.9 percent).



Severity of ED Patients

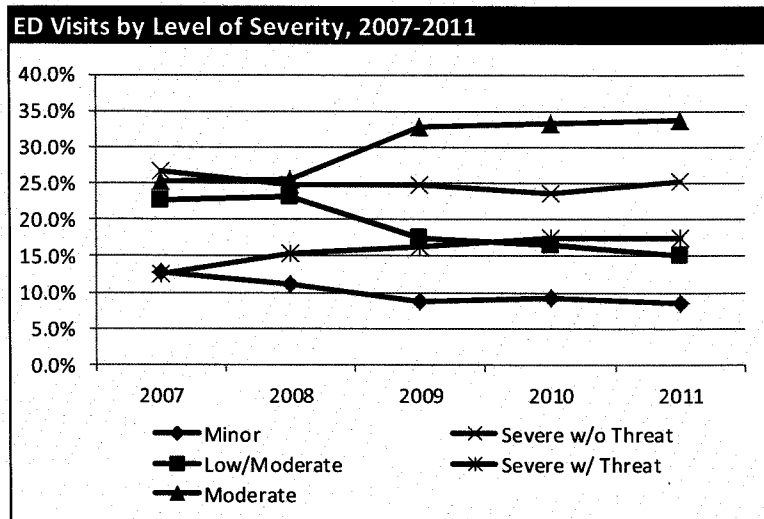
All Riverside County ED visits are classified into one of five categories based on the complexity of the medical decision and the severity of the problem.

ED Visits by Level of Severity, 2007 and 2011			
Severity Level	2007	2011	Change
Minor	12.8%	8.5%	-4.3%
Low/Moderate	22.6%	15.1%	-7.5%
Moderate	25.2%	33.8%	8.5%
Severe w/o Threat	26.7%	25.1%	-1.6%
Severe w/ Threat	12.6%	17.5%	4.9%

Source: OSHPD Hospital Annual Utilization Pivot Profiles, 2007 & 2011

Figure 28 - Riverside County ED Visits by Severity Level, 2007-2011

The overall severity of visits seen in the ED has been trending up in recent years.¹⁵ The proportion of ED visits classified as minor and low/moderate has declined while the proportion of ED visits classified as moderate and severe with threat has increased.



Source: OSHPD Hospital Annual Utilization Data, 2007-2011

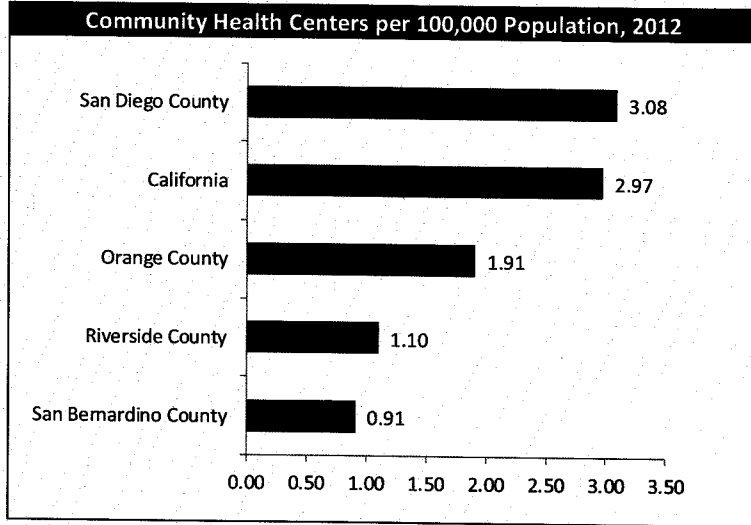
Figure 29 - Graphical Trend: Proportion of ED Visits Classified by Severity, 2007-2011

¹⁵ ED visit severity is coded by hospitals and trends may be a reflection of coding practices rather than actual changes in visit severity. For example, adoption of electronic medical records in EDs could imply an increase in severity if more services/procedures are being captured in the patient's medical record than were previously.



Community Clinics per Population

In 2012, there were 1.10 community health centers for every 100,000 residents in Riverside County. This was below the state average of 2.97 and below other counties in the region.



Source: OSHPD Healthcare Information Resource Center, December 2012, US Census Bureau, 2013

Figure 30 - California Community Clinics per Population

Physicians per Population

Riverside County's ratio of population to primary care physicians is 2,515:1, which is well below the ratio for both California and the US.

Ratio of Population to Primary Care Physicians, 2013	
Riverside County	2,515:1
California	1,341:1
National Benchmark*	1,067:1

* 90th percentile among all U.S. counties

Source: County Health Rankings, 2013

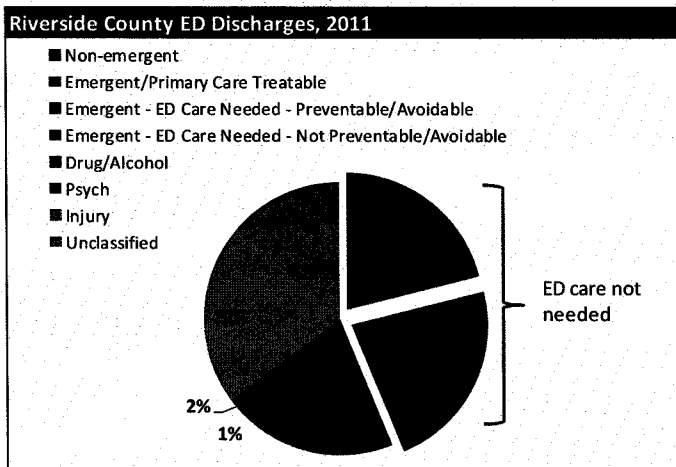
Figure 31 - Physicians per Population



Preventable/Avoidable ED Visits

To investigate preventable/avoidable ED visits further, all visits that did not result in admission were analyzed by employing the New York University (NYU) ED Algorithm. The analysis used as data all ED discharges in Riverside County EDs in 2011.

The algorithm classifies patients based on their primary discharge diagnosis (i.e., ICD-9) as either non-emergent, emergent but treatable in a primary care setting, or ED care needed. The algorithm does not classify drug/alcohol, psychiatric, or patients with an injury. Findings from the algorithm show that 44 percent of ED discharges could be classified as not needing ED care.



Source: NYU ED Algorithm, OSHPD Emergency Department Discharge data, 2011

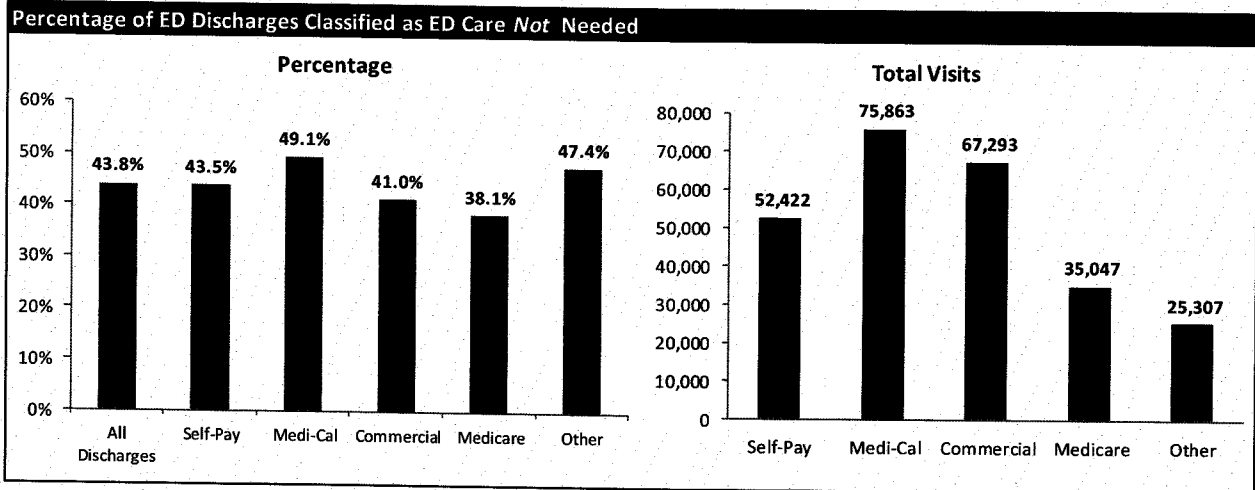
Figure 32 - Riverside County Preventable/Avoidable ED Visits

NYU ED Algorithm Definitions:

- Non-emergent** - The patient’s initial complaint, presenting symptoms, vital signs, medical history, and age indicated that immediate medical care was not required within 12 hours;
- Emergent/Primary Care Treatable** - Based on information in the record, treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting. The complaint did not require continuous observation, and no procedures were performed or resources used that are not available in a primary care setting (e.g., CAT scan or certain lab tests);
- Emergent - ED Care Needed - Preventable/ Avoidable** - Emergency department care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable/avoidable if timely and effective ambulatory care had been received during the episode of illness (e.g., the flare-ups of asthma, diabetes, congestive heart failure, etc.); and
- Emergent - ED Care Needed - Not Preventable/ Avoidable** - Emergency department care was required and ambulatory care treatment could not have prevented the condition (e.g., trauma, appendicitis, myocardial infarction, etc.).



When the data is stratified by payer mix, Medi-Cal patients have the highest percentage of visits that are classified as “not needing ED care” (49.1 percent) and also have the highest total number of visits classified as “not needing ED care” (75,863 visits).



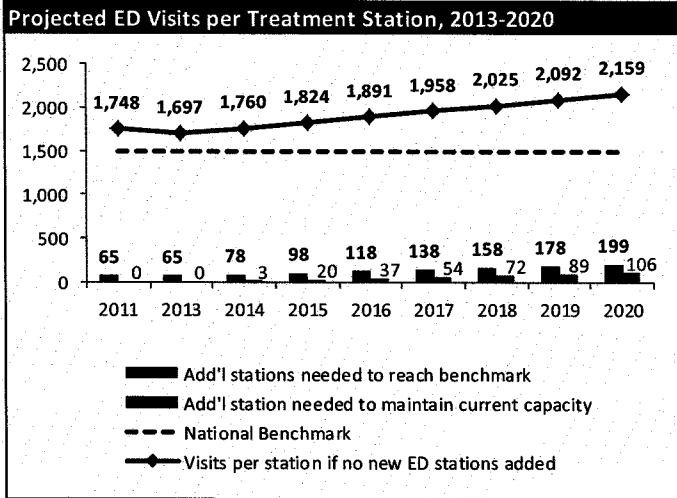
Source: OSHPD 2010 Emergency Department Data & NYU ED Algorithm

Figure 33 - Riverside County Preventable/Avoidable ED Visits by Payer

Emergency Department (ED) Treatment Station Projections

Beds that are located in the ED are known as treatment stations. ED treatment stations require a license.

There were a total of 394 ED treatment stations that treated 688,760 ED patient visits in Riverside County in 2011, which equates to 1,748 ED visits per station. In 2011, Riverside County saw the first decline in ED visits per station than in the previous years. ED capacity in Riverside County was expanded in 2011 with the addition of 22 ED treatment stations at Southwest Healthcare System (Rancho Springs Medical Center and Inland Valley Medical Center) and the opening of Loma Linda University Medical Center – Murrieta (19 stations). ED treatment station expansion has continued as San Geronio Memorial Hospital opened 27 new ED beds in May of 2013 and 41 ED treatment stations are scheduled to be opened at the new Temecula Valley Hospital in the fall of 2013.

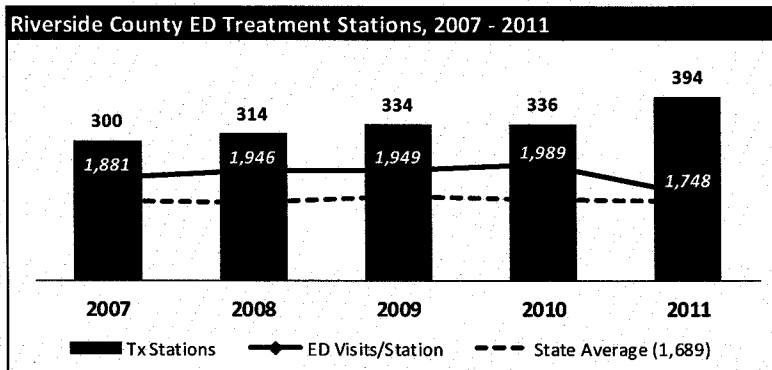


Note: Projection includes 27 ED beds at the new San Geronimo Memorial Hospital ED and assumes an additional 41 stations will be added when Temucula Valley Medical Center opens in fall of 2013.

Source: OSHPD Hospital Utilization data, The Abaris Group, 2013

Figure 34 - Riverside County ED Capacity Projections

Even with the recent additions and scheduled opening of Temecula Valley Hospital, ED capacity in Riverside County lies above the national benchmark of 1,500 visits per station. If no stations are added beyond what is already planned, the number of ED visits per station is projected to rise to 2,159 by 2020. To reduce the number of ED visits per station to the national benchmark, Riverside County would need an additional 199 stations by 2020 to make up for current shortages and keep with rising ED demand. To maintain the 2011 rate of 1,748 ED visits per station, the county would need an additional 106 treatment stations by 2020.



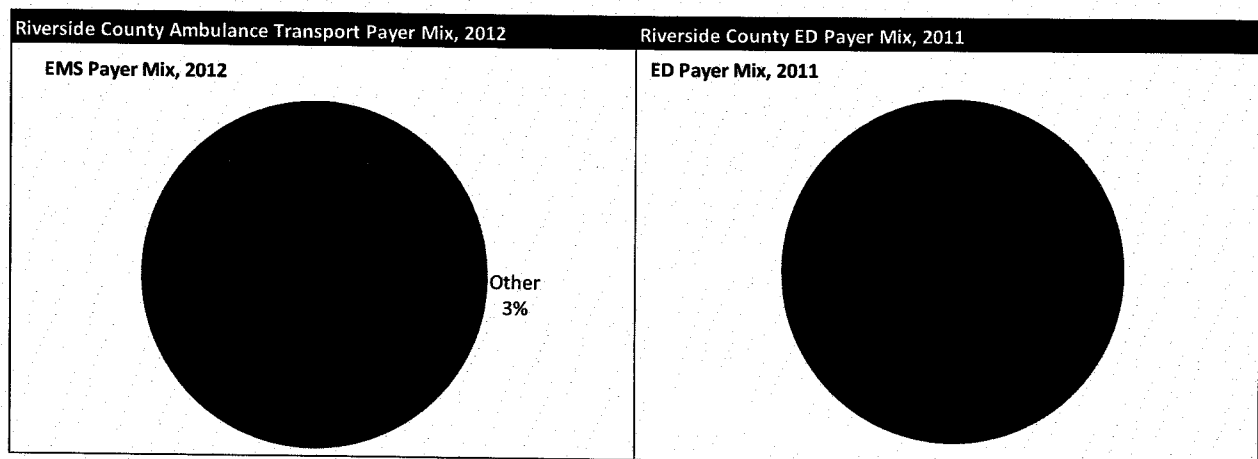
Source: OSHPD Annual Utilization Data, 2007-2011

Figure 35 - Riverside County ED Treatment Stations, 2007 - 2011



Emergency Medical Services (EMS) & Emergency Department (ED) Payer Mix

Patient data from the Office of Statewide Health Planning and Development (OSHPD) for 2011 was used to examine ED payer mix. The most common type of payer that resulted in an ED visit was commercial insurance (27 percent) followed by Medi-Cal (25 percent). The uninsured (i.e., "Self Pay") accounted for 19 percent of all ED visits. EMS payer mix data was obtained for AMR, Cathedral City, Idyllwild Fire Protection District, and Riverside County Fire Department-Indio. Compared with the ED payer mix, the EMS payer mix has a higher proportion of Medicare patients and fewer Medi-Cal patients. The proportion of commercially insured and the uninsured are similar in both ED and EMS.



Sources: AMR, Cathedral City, Idyllwild Fire Protection District, and Riverside County Fire

Source: OSHPD Emergency Department Discharge data, 2011

Figure 36 - EMS and ED Payer Mixes

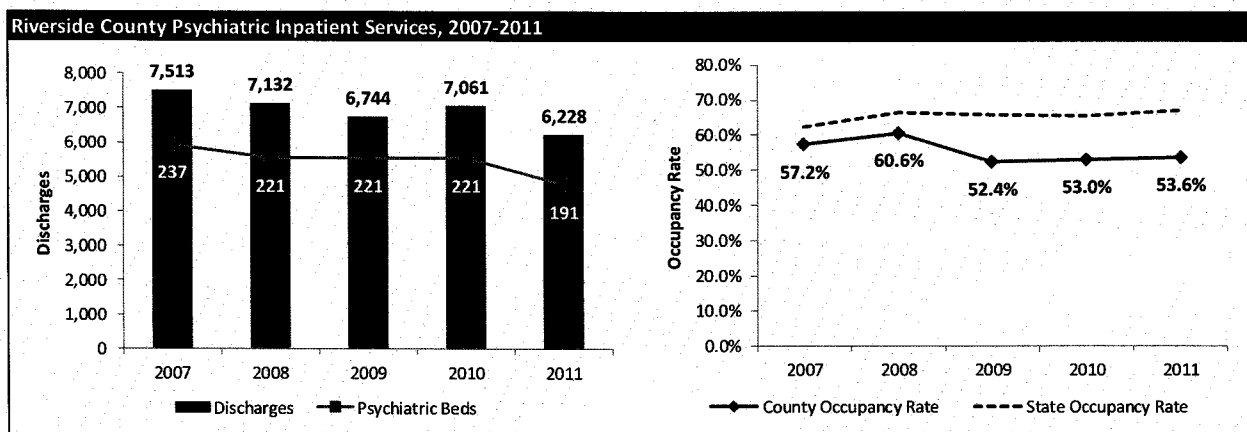


Psychiatric Care

There are a total of 191 licensed inpatient psychiatric beds at four facilities in Riverside County:

- Riverside County Regional Medical Center – 77 beds
- Oasis Psychiatric Health Facility – 16 beds
- Corona Regional Medical Center-Magnolia – 40 beds
- Riverside Center for Behavioral Medicine – 58 beds

Capacity to treat psychiatric patients in Riverside County has declined by 46 beds since 2007 (30 beds at Kaiser-Moreno Valley and 16 beds at Hemet Valley Medical Center). Even with this decline in capacity, licensed bed occupancy rates remain below the state average (Figure 37).

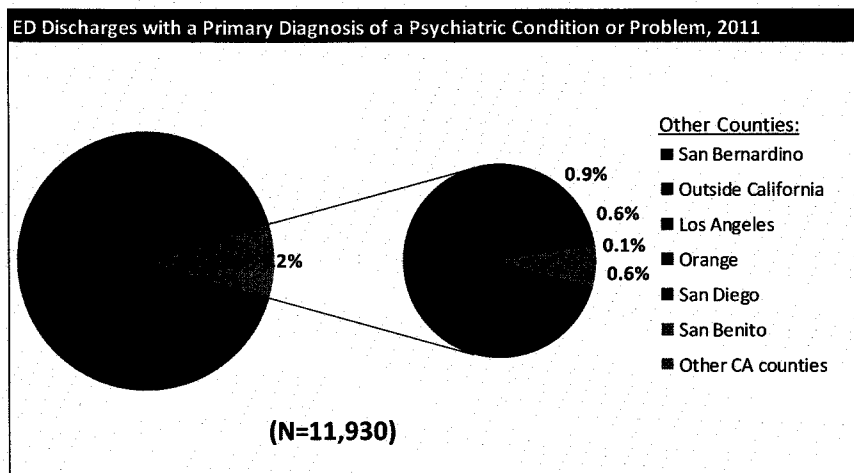


Source: OSHPD Hospital Annual Utilization Data, 2007-2011

Note: Discharges from licensed psychiatric beds only. Bed occupancy does not take into account specialized psychiatric beds.

Figure 37 - Psychiatric Inpatient Services, 2007-2011

In Riverside County, there were a total of 11,930 psychiatric-related ED discharges (e.g., not admitted) in 2011.¹⁶ Over 90 percent of these discharges were residents of Riverside County (Figure 38).



Source: OSHPD 2011 Emergency Department Data & NYU ED Algorithm

Figure 38 - ED Discharges with Primary Diagnosis of Psychiatric Condition, 2011

¹⁶ The NYU algorithm is based on primary ICD-9-CM discharge diagnosis. Therefore, any diagnoses of psychiatric conditions/problems not considered the chief cause of the encounter for care in the ED visit are not included.



Psychiatric Beds per Population

In 2011, there were 8.6 licensed psychiatric beds for every 100,000 residents in Riverside County. This was well below the state average of 23 and below other counties in the region (Figure 39).

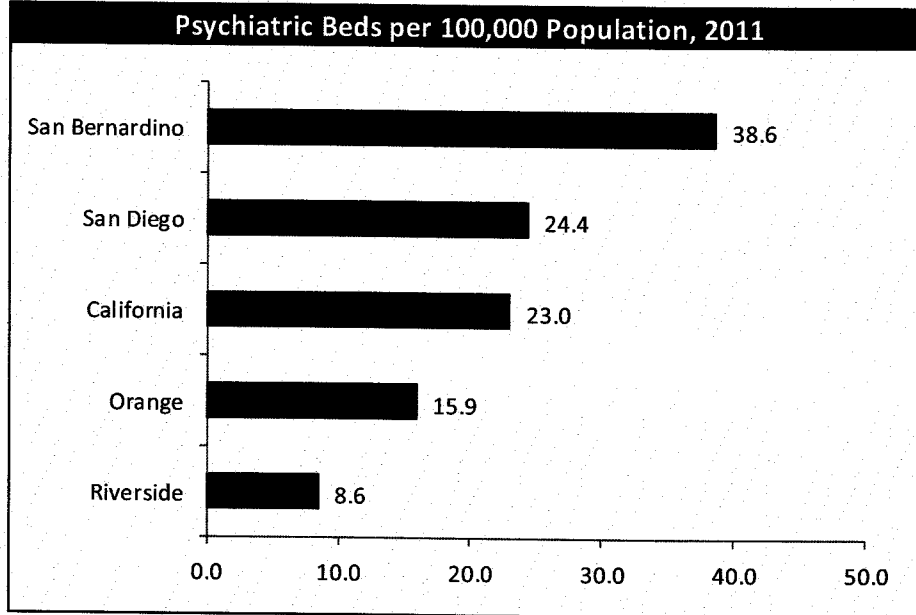


Figure 39 - Psychiatric Beds per 100,000 Population, 2011

Among all California counties with at least one million residents, Riverside County has the fewest psychiatric beds per population (Figure 40).

	Population	Licensed Psychiatric Beds	Psych Beds/ 100,000 pop.
San Bernardino	2,053,348	792	38.6
Los Angeles	9,860,836	3,547	36.0
Sacramento	1,430,884	376	26.3
San Diego	3,125,321	762	24.4
Alameda	1,526,220	360	23.6
Orange	3,047,120	486	15.9
Contra Costa	1,061,375	116	10.9
Santa Clara	1,806,881	166	9.2
Riverside	2,220,502	191	8.6
California	37,570,307	8,659	23.0

Sources: State of California, Department of Finance, E-6. Population Estimates and Components of Change by County — July 1, 2010–2012, December 2012; OSHPD, 2011 Hospital Annual Utilization Database

Figure 40 - Psychiatric Beds per 100,000, 2011



5150 Utilization

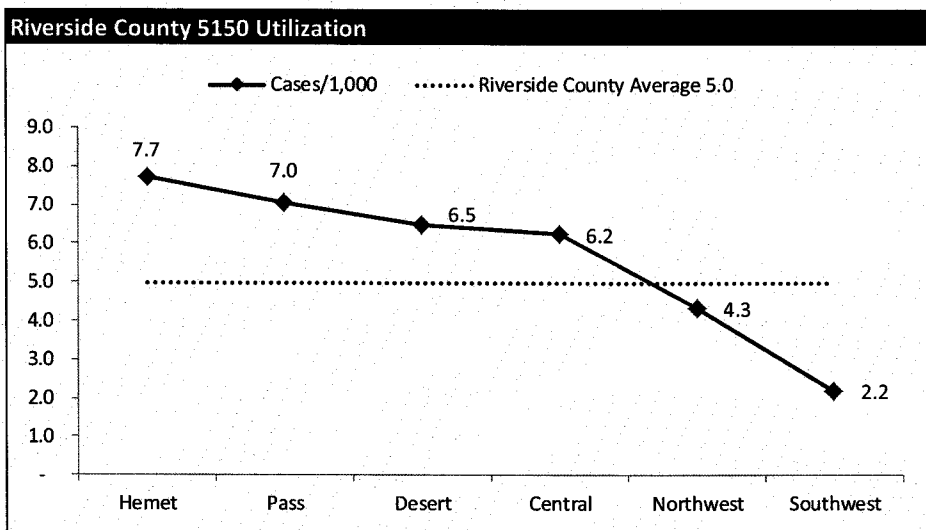
Riverside County’s 5150 utilization by zone is displayed in Figure 41. The Hemet Zone had the highest incident rate (7.7) followed by the Pass Zone (7.0). The zone with the highest number of 5150 transports was the Desert Zone (3,123) followed by the Northwest Zone (3,110).

Riverside County 5150 Utilization			
Zone	Volume	Population	Cases/1,000
Hemet	1,379	178,124	7.7
Pass	626	88,795	7.0
Desert	3,123	480,563	6.5
Central	1,971	316,180	6.2
Northwest	3,110	717,771	4.3
Southwest	1,042	474,981	2.2
Mountain	8	14,392	0.6
Total	11,263	2,270,806	5.0

Source: US Census Block Data 2010, AMR 5150 data 2012, The Abaris Group calculation, 2013

Figure 41 - 5150 Utilization - Table

Figure 42 below is a graphical representation of 5150 utilization. Only three zones, Northwest, Southwest and Mountain Plateau (not displayed) fall below the average utilization rate of Riverside County (5.0).



Note: The Mountain Zone is not shown in this graph because of low volume and population

Source: US Census Block Data 2010, AMR 5150 data 2012, The Abaris Group calculation, 2013

Figure 42 - 5150 Utilization - Graph

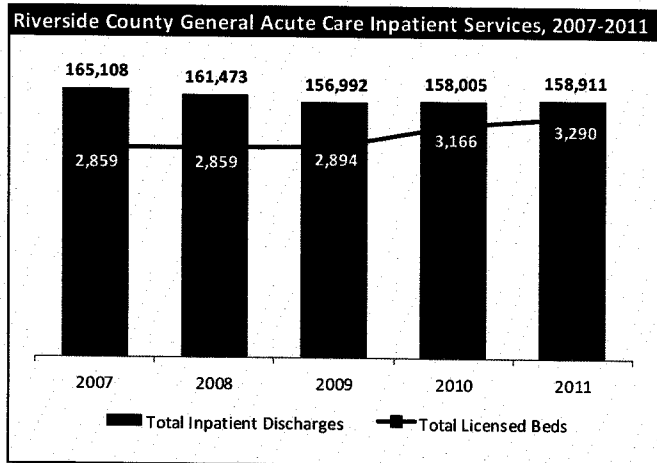


Hospital Data

Inpatient OSHPD data was reviewed for the 16 acute-care hospitals that have an ED. The inpatient data presented does not include admissions from the following facilities:

- The Betty Ford Center at Eisenhower
- Riverside Center for Behavioral Medicine
- Oasis Psychiatric Health Facility
- Corona Regional Medical Center-Magnolia
- Kindred Hospital Riverside

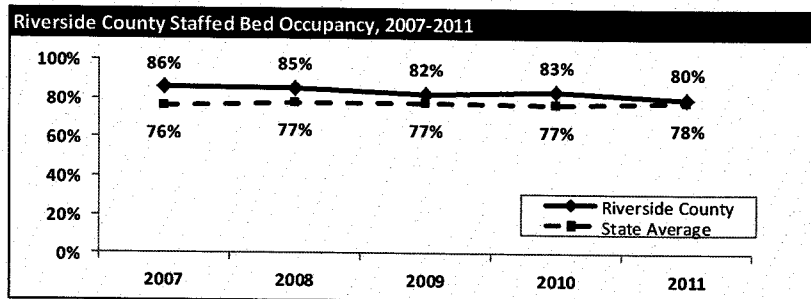
The number of acute care inpatient services in Riverside County hospitals declined from 165,108 in 2007 to 158,911 in 2011. Concurrently, the number of licensed beds in the County increased from 2,859 to 3,290.



Source: OSHPD Hospital Annual Financial Data, 2007-2011

Figure 43 - Riverside County Inpatient Services

Staffed bed occupancy rates were slightly above the state average from 2007 to 2011 but have declined from 86 percent in 2007 to 80 percent in 2011.

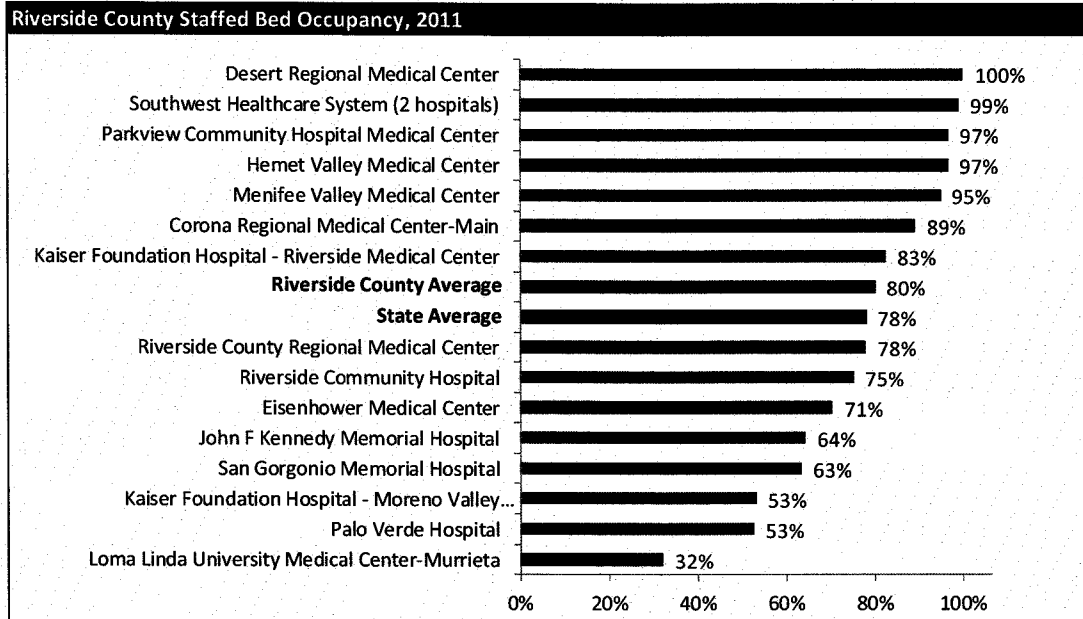


Source: OSHPD Hospital Annual Financial Data, 2007-2011

Figure 44 - Riverside County Bed Occupancy Rates



Seven hospitals in Riverside County have staffed bed occupancy rates above the statewide average. In 2011, bed occupancy rate ranged from 32 percent at Loma Linda University Medical Center-Murrieta (opened 4/15/2011) to 100 percent occupancy at Desert Regional Medical Center. The statewide and County average occupancy rates were almost identical in 2011.



Note: Loma Linda University Medical Center-Murrieta data is for partial year, opened 4/15/2011

Source: OSHPD Hospital Annual Financial Data, 2011

Figure 45 - Riverside County Bed Occupancy Rates by Hospital



Emergency Medical Services System

Overview

The mission of the Riverside County EMS System is to provide optimal emergency pre-hospital medical care to residents and visitors. This is achieved through planned processes for readiness, response, on scene care, transport to definitive care, transition of care and documentation and continuous quality improvement (CQI).

Emergency Medical Services Agency

The mission of the Riverside County EMS Agency (REMSA) is to ensure the timely provision of high quality emergency medical services to the residents and visitors of Riverside County. As one of 32 Local EMS Agencies (LEMSAs) in the State of California, REMSA is responsible to plan, implement, monitor, and evaluate for the Countywide EMS system pursuant to the California Health and Safety Code, Division 2.5 and the regulations and guidelines adopted by the State EMS Authority (EMSA). REMSA continues to meet new challenges as the EMS delivery system changes.

REMSA and its medical director provide clinical oversight through medical and operational protocols and the CQI process. REMSA's medical director is responsible for medical direction and establishment of medical control over the local EMS system. This is accomplished by establishing policies, protocols and procedures for:

- Authorization of Pre-hospital Receiving Hospitals (PRC), Base Hospitals (BH) and Specialty Care Centers (SCC)
- Clinical and Performance Quality improvement
- EMS Dispatching and Response
- Medical Treatment and Procedures
- Multiple Casualty Incidents (MCIs)
- Patient Care Documentation and Data Management
- Provider Credentialing
- Training and Education

In order to foster a collaborative approach to EMS system design and operation, REMSA has established a variety of stakeholder advisory committees to receive input during the development and implementation of policies, protocols and procedures. REMSA also provides round-the-clock system monitoring and support through a Duty Officer/Duty Chief program.



Additional administrative responsibilities for REMSA Include:

- Development and Monitoring of Contracts for Emergency Ambulance Services
- Development and Monitoring of Contracts with Authorized Pre-hospital Receiving Hospitals (PRC), Base Hospitals (BH) and Specialty Care Centers (SCC)
- Development and Monitoring of Contracts with Authorized ALS Provider Agencies
- Permitting and Regulation of Ambulance Providers and Air Ambulance Providers
- Development and Submission of the County EMS Plan
- Development and submission of the County Trauma Plan
- Personnel Credentialing Enforcement and Disciplinary Proceedings

One of REMSA's primary roles is to monitor, track, and report the performance of the transport providers in the 12 ambulance zones, 10 of which are exclusive operating areas (EOAs). REMSA staff compiles and shares response data with the first response and transport providers of each EOA on a quarterly or semiannual basis.¹⁷

Public Access

The entire County of Riverside is covered by enhanced 9-1-1 services, which provide the dispatcher with the caller's location, coverage includes the Native American reservations. Historically, cellular phone calls to 9-1-1 were challenging as the caller location was unknown and were transferred to the California Highway Patrol (CHP) before being routed to the appropriate Public Safety Answering Point (PSAP). With the new generation of cellular phones and the availability of latitude/longitude information, calls are automatically directed to the most appropriate PSAP for disposition. Typically, the location information is so precise, that dispatchers know the address of the caller. There are a few unincorporated areas for which the CHP remains the primary answering point but that is expected to change over the next 6-12 months as these areas are identified and reprogrammed accordingly.

9-1-1 Dispatch/Public Safety Answering Point (PSAP) System

The Abaris Group conducted two days of site visits and interviews with leaders and dispatch staff of seven of the key dispatch centers and/or PSAPs. The purpose of the interviews was to gain an insight into the operations, procedures and relationships with other stakeholders in the Riverside EMS system and to gain a picture of how 9-1-1 calls for medical incidents are routed and managed. There are a number of different mechanisms for the receipt, transfer and medical management of these 9-1-1 calls for assistance.

¹⁷ A local EMS agency staffing benchmark survey is underway and will be added to this report upon completion.



The Abaris Group met with officials from the cities of Riverside, Corona, Murrieta and Palm Springs as well as the dispatch center at American Medical Response (AMR), the current county contract ambulance provider, the County Sheriff's main dispatch center in Riverside and the Riverside County Fire Department Emergency Communications Center (ECC) in Perris. A brief summary of those individual site visits is provided below.

City of Riverside

The City of Riverside PSAP has moved successfully to a renovated city building, and will be expanding from 14 dispatch positions to 17 in the new center. Typical staffing in the PSAP would be 10 positions; 7 call-takers and 3 dispatchers with one or two supervisors, depending on the time of day.

Annually, the police department handles over 180,000 to 200,000 incidents, with approximately 29,000 of those calls for fire department calls with 18,000 – 19,000 of those for medical emergencies. Total phone calls made and received by the City's PSAP is approximately one million per year. All of the dispatchers are trained and certified as Emergency Medical Dispatchers through Medical Priority's certification course. Emergency medical dispatch (EMD) is provided using Medical Priority Dispatch System (MPDS) Pro QA software.

The City of Riverside transitioned to providing EMD in 2006. New personnel must complete an 18-month probation. All first through fourth party calls are provided EMD by the City, and all low acuity (e.g., "alpha" and "omega") determinant calls are "ambulance-only" responses, with the City not providing first response on those calls.

Quality improvement activities are conducted in compliance with MPDS standards. Between 3-5 percent of all EMD calls are reviewed using the Advanced Quality Assurance (AQUA) product (the quality improvement software product of ProQA). Feedback is provided to individual dispatchers privately, as required. Dispatch center trended statistics are posted and reviewed on a monthly basis, with annual reports prepared as well. The City of Riverside states that their average call time to dispatch was 62 seconds in 2012 (via data dump between dispatch centers).

As noted above, the transfer of call data to the County ambulance contractor is via a "data dump" to the ambulance dispatch center. The City did not report any issues with their transfer process to AMR.

The City of Riverside maintains a separate contract with AMR that includes extended ambulance response times for AMR, in return for a specified amount of funding to help offset the ALS first responder costs to the City. The response time requirement is relaxed from a 9 minute 59 second or better requirement to an 11 minute 59 second or better requirement. ALS first responder response time standards under the agreement are 9:59 minutes 90 percent of the time with a goal of 7:59 minutes 90 percent of the time. As of the writing of this report, the ALS first responder response times are not being publically reported.



City of Corona

There are a total of 10 positions at the dispatch center. Typical round-the-clock staffing in the PSAP would be 6-7 positions; 3-4 call-takers and 3 dispatchers with one supervisor.

The City computer aided dispatch (CAD) vendor is the West Covina Service Group, a division of the West Covina Police Department. The city uses Motorola consoles, and describes a backup system of redundant servers in the event of a loss of the primary server.

Annually, the police department handles over 200,000 calls, with approximately 8,000 of those calls for medical emergencies. All of the dispatchers are trained and certified in incident command, CPR, pre-arrival instruction and all are also certified by Peace Officers Standards and Training (POST). EMD is provided using an in-house developed medical dispatch product, which is approved by the City's medical director and REMSA.

Quality assurance activities are conducted on a monthly basis. The City states that it reviews ten medical calls per month, which equates to approximately 1.5 percent of all medical calls. There was no description of the specific review process nor any specific criteria or benchmarks identified. Feedback is provided to individual dispatchers; however, no monthly or annually trended dispatch data is reviewed. Corona states that its average call processing time is approximately one minute. Corona also uses a "data dump" to AMR for the transfer of call information. The City did not report issues with the transfer process to AMR.

Like the City of Riverside, Corona maintains a separate contract with AMR with relaxed ambulance response times. AMR provides a specified amount of funding to help offset the ALS first response costs to the City. The response time requirement is the same as noted for the City of Riverside. The City does have a response time standard of 90 percent within 9:59 and with a response time goal of 7:59 fractile, which is located in the contract with AMR and the contract calls for holdbacks of payment if the City does not meet its performance standard. The City provides that response report to AMR on a monthly basis but does not report to the County of Riverside.

City of Palm Springs

The City does not maintain or contract for secondary PSAP functions for medical requests, and sends a fire unit to all medical emergencies. There is no EMD provided to 9-1-1 callers in Palm Springs.

The City CAD vendor is Cyrun, and the CAD runs on Dell Power Edge servers. The City states that it has a redundancy server in the event of a failure of the primary. Palm Springs has no CAD-to-CAD interface with any other party in the EMS system; but expressed great interest in establishing such interfaces with the County ambulance provider or whoever assumes responsibility for ambulance dispatching. The only hesitation to implement a CAD-to-CAD linkage is the cost of establishing such a system.



The City maintains five dispatch positions. There are two to four dispatchers and a supervisor on duty, depending on the time of day. The center receives nearly 75,000 calls annually, with approximately 8,000 of the calls for a medical emergency.

Palm Springs sends dual tones – multi-frequency (DTMF) to AMR with dispatch information when it notifies its fire units. When a button is pressed on a keypad, a connection is made that generates two tones at the same time. The tones identify the key that was pressed to any equipment, and will activate the receiving end of the “connection.” The City states that there have been intermittent issues with the tone-out process with AMR not receiving some calls and with delays in dispatching units to the scene. At the time of the interview, the City stated that the frequency of such errors has been reduced over the past two months. While the City cited potential reasons for the decrease, there was no specific issue identified as the cause.

The dispatch manager states that the center’s call processing times are 45.6 percent in 60 seconds or less. An average processing time was not provided. The City also states that it is using the Higher Ground Next Generation Quality911 quality assurance program. Palm Springs is processing between 80 and 120 calls per month. This equates to a review percentage of approximately two percent of their call volume; the industry standard for medical dispatching is approximately seven percent.

City of Murrieta

The City does not operate or contract for secondary PSAP operations. The primary PSAP dispatches all police and fire responses and places requests for ambulance response by telephone line to the AMR dispatch center.

There are six dispatch positions in the PSAP. Round-the-clock staffing typically consists of four dispatchers and one supervisor. The City processes in excess of 40,000 calls per year, with approximately 7,400 of those calls being fire responses. The City states that the fire department runs approximately 60 percent EMS and 40 percent fire and other responses. The City responds to just under 4,500 EMS calls per year.

The CAD vendor for Murrieta is Cyrun, and the City operates mirrored, redundant servers for backup capability. EMD is not provided for medical calls in Murrieta. All medical requests receive a fire and ambulance response. As with other jurisdictions, there is an interest in CAD-to-CAD interface with AMR; however, the City of Murrieta has concerns as well for the initial and on-going costs of establishing such an interface.



AMR Dispatch Center

The dispatch center at AMR functions as neither a primary nor secondary PSAP. Its purpose is to receive requests for service from the various primary and secondary PSAPs throughout Riverside County. The center receives emergency and non-emergency requests for inter-facility transfers and other non-emergency ambulance scheduling in addition to managing the system status plan and unit deployment.

AMR utilizes Tritech CAD, which is integrated with its Global Positioning System (GPS)/Automatic Vehicle Location (AVL) system and makes recommendations on unit selection and posting moves. AMR is not utilizing MARVLIS¹⁸ or other related advanced technologies for deployment strategies.

AMR expressed interest in establishing CAD-to-CAD interfaces; however, the overall cost of such interfaces and the number of connections needed still remains a concern. AMR has a CAD-to-CAD interface with the Riverside County Fire Department ECC and describes the transfer of dispatch data as seamless.

AMR typically staffs the dispatch center with a combination of 3 call-takers and three dispatchers/system status controllers (SSC), and has the ability to increase staffing for high volume periods. The AMR dispatch center processed 150,194 9-1-1 calls in 2012, along with 37,814 other types of calls for a total of 188,008 calls.

Riverside County Sheriff's Dispatch Center

A site visit to the Sheriff's Dispatch Center was conducted. The dispatch center operates a primary PSAP only. It transfers fire and medical calls to the Riverside County Fire Department ECC in Perris. The primary dispatch center in Riverside has 23 dispatch positions while satellite centers in Palm Desert and Blythe have seven and one positions, respectively. The dispatch center handles in excess of 1.6 million calls per year, with approximately eight percent of those being fire/EMS emergencies.

Riverside County Fire Department Emergency Communications Center (ECC)

The ECC provides secondary PSAP services to all of the unincorporated areas in Riverside County as well as 21 contracted cities, two tribal entities, Idyllwild Fire Protection District, and County Environmental Health. The ECC also provides EMD utilizing Pro QA software to each of those entities. This system is integrated with a Northrup/Grumman CAD system.

The ECC is a combination of County employees and Riverside County Fire Department staff. All of the dispatchers are County employees. There are supervisory positions staffed by Riverside County Fire Department captains. There are a total of 12 positions within the dispatch center. The hardware utilized in the center is Dell servers with a CISCO network. All mobile assets utilize Panasonic Toughbook 19's. The mobile data computers receive real-time notes from the CAD for call specifics.

¹⁸ Motorola's Mobile Area Routing and Vehicle Location Information System



All dispatchers are certified by the National Association of Emergency Dispatch (NAED), and receive weekly feedback through the CQI system regarding performance. All pre-arrival instructions are reviewed to ensure compliance with MPDS standards. Additionally, trended data is posted on a monthly basis and drives the continuing education process.

The Riverside County Fire Department (operated by CAL FIRE) is unique in California, as it constitutes nearly one third of all of CAL FIRE's operations statewide. Most of their information technology support positions are maintained in-house with either Riverside County Fire Department or county employees, allowing for an immediate response to any technical issues. Approximately 130,000 incidents are processed at the ECC annually, with 80 percent of those being medical emergencies. Management at the ECC indicated an interest in working with the County and the REMSA to facilitate the consolidation of ambulance dispatching services. ECC management stated that they were confident that such consolidated services would produce costs savings to all of the parties.

Riverside County Public Safety Enterprise Communication (PSEC)

The Public Safety Enterprise Communication project, which is hosted by Riverside County, is the expansion of the communications system capabilities and its associated infrastructure. The current system provides coverage to only about 60 percent of the County and is at the end of its useful life. PSEC is no longer adequate to meet the County's coverage and capacity needs. Population growth within the County is necessitating the expansion of coverage. Additionally, due to increases in the County's radio usage and technological enhancements, additional traffic-carrying capacity is required to meet the needs of emergency services personnel.

The communications expansion includes both 700 MHz and VHF capabilities, and greatly expands the communications tower locations, as noted in Figure 46.

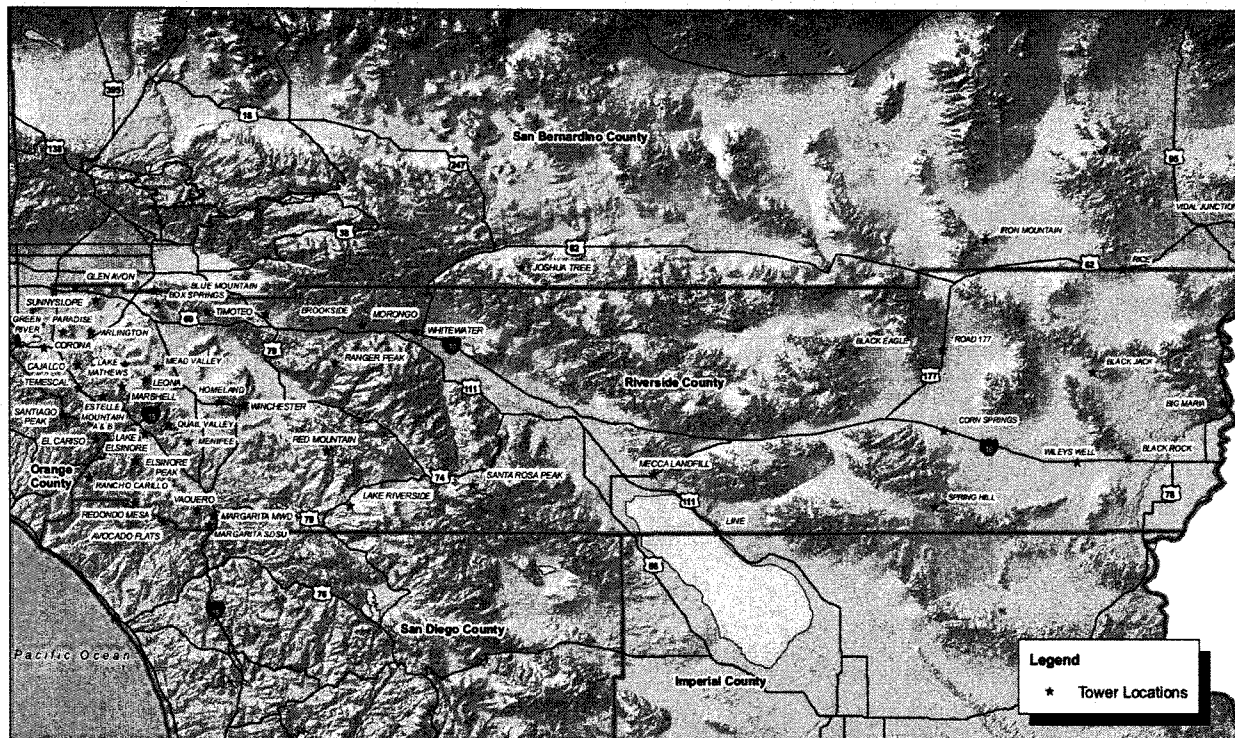


Figure 46 - Riverside County Public Safety Enterprise Communication (PSEC)

Officials with the County stated that the new system standard required the vendor to achieve a “95 percent coverage of the County, 99 percent of the time from a hand-held radio.” PSEC officials state that this standard has been achieved and that the new system has greatly improved voice and data coverage and transfer speed and capacity. A marketing strategy has been developed, and County officials are in the process of meeting with community leaders around the County to discuss expansion opportunities with other potential users. At a cost approximating \$151 million dollars to establish, one key to adding additional users will be ensuring that the cost of participation is reasonable and consistent with the value that users will realize.

PSEC officials that spoke stated that the cost to users will be based on the equipment utilized and on-going maintenance. The County indicated that no recovery of the initial system investment will be included with the cost of participation.



Summary of Review

The Riverside County emergency services network of PSAPs and dispatch centers is very complex and is comprised of both state-of-the-art technology as well as many opportunities for improving both technology and process. Riverside County contains 28 incorporated cities, with 15 Primary PSAPs, including the three CHP locations and the University of California (UC) Riverside Police Department. Additionally, there are seven secondary PSAPs for EMS/Fire requests. Figure 47, below, displays these relationships in more detail:

Riverside County PSAPs and Dispatch Centers						
Primary PSAP	Secondary PSAP	EMD Provided By:	Ambulance Dispatch Info Transfer	Population served by EMD	EMD Product	
Banning P.D.	RivCo/CalFire ECC	RivCo/CalFire ECC	CAD to CAD - AMR	29,603	MPDS	
Beaumont P.D.	RivCo/CalFire ECC	RivCo/CalFire ECC	CAD to CAD - AMR	36,877	MPDS	
Blythe P.D.	NA	No	Phone Line to River Medical	0	NA	
Riverside County Sheriff's Office Primary PSAP for: Calimesa, Canyon Lake, Coachella, Eastvale, Indian Wells, Jurupa Valley, Lake Elsinore, La Quinta, Menifee, Moreno Valley, Morongo Indian Reservation, Norco, Palm Desert, Perris, Rancho Mirage, San Jacinto, Temecula, Wildomar and all unincorporated areas	RivCo/CalFire ECC	RivCo/CalFire ECC	CAD to CAD - AMR	1,415,837	MPDS	
Cathedral City PD/Fire/EMS	Cathedral City PD/Fire	No	NA	0	NA	
CHP	RivCo/CalFire ECC	RivCo/CalFire ECC	CAD to CAD - AMR	NA	MPDS	
CHP	RivCo/CalFire ECC	RivCo/CalFire ECC	CAD to CAD - AMR	NA	MPDS	
CHP	RivCo/CalFire ECC	RivCo/CalFire ECC	CAD to CAD - AMR	NA	MPDS	
Corona PD/Fire	Corona	Corona	Data Dump to AMR	152,374	In-House	
Hemet PD ¹	Hemet	No	Two-way Radio	0	NA	
Indio PD	RivCo/CalFire ECC	RivCo/CalFire ECC	NA	76,036	MPDS	
Murrieta PD/Fire	Murrieta	No	Phone Line to AMR	0	NA	
Palm Springs	Palm Springs	No	Two-way Radio	0	NA	
Riverside City	Riverside City	Riverside City	Data Dump to AMR	303,871	MPDS	
UC Riverside PD	Riverside City	Riverside City	Data Dump to AMR	26,500 ²	MPDS	
				Total Population Served by EMD	2,041,098	93.22%

Source: Riverside County EMS Agency and On-Site Inspections
¹ Hemet has applied for grant funding to implement EMD
² UC Riverside students, faculty and staff. <http://www.ucr.edu/staff/>

Figure 47 - Riverside County PSAPs and Dispatch Centers



Pre-hospital Providers

Two-Tiered Advanced Life Support (ALS) System

The Riverside County emergency medical services (EMS) system is an integrated, cooperative system that includes public, private and public-private partnerships for coordination of resources focused on delivering optimal care in the pre-hospital environment. For the majority of the County, the current EMS system utilizes a two-tiered Advanced Life Support (ALS) response design. This design provides for fire department ALS first response to medical calls with either a private ALS ambulance or fire department ALS ambulance providing transportation to the hospital. The design allows for optimal use of ALS resources Countywide by providing the option of ALS transfer of care in the field as well as providing for two ALS trained personnel to continue care during transport to the hospital when dictated by patient need. The two-tiered ALS response system has also provided the following benefits to the Countywide EMS system:

- Assures ALS care from the ambulance crew during rare events when ALS first responders were not available (e.g., wildfires, major emergencies)
- Provides experienced paramedics for staffing transitions between provider agencies (e.g., fire departments hire paramedics from the private ambulance provider)
- Provides additional paramedics during Multiple Casualty Incidents (MCIs) and when needed for EMS surge events (e.g., additional resources required during H1N1)

First Responders

There are nine fire departments within Riverside County who provide first response EMS within the incorporated and unincorporated service areas. The two tribal lands and one air reserve base are covered by internal departments (see Figure 48). A significant area of the County is covered by Riverside County Fire Department through agreements with individual cities as well as the County of Riverside (for unincorporated areas).

Most first responder agencies have firefighter/paramedics staffing ALS fire engines, squads, or trucks who respond to medical calls. The only incorporated areas without firefighter/paramedics are the cities of Hemet, Blythe, and Calimesa. Hemet Fire is staffed with emergency medical technicians (EMTs) and provides BLS care for all medical calls. The City of Calimesa’s BLS first response services are provided by the Riverside County Fire Department. Blythe Fire is an all-

First Responder Medical Service Level	
Incorporated	Unincorporated/Reserve Area
Blythe Fire Department	FR
Cathedral City Fire Department	ALS
Corona Fire Department	ALS
Hemet Fire Department	BLS
Idyllwild Fire Protection District	ALS
Murrieta Fire Department	ALS
Palm Springs Fire Department	ALS
Riverside County Fire Department	ALS
Riverside County Fire Department - Calimesa	BLS
Riverside Fire Department	ALS
Reserve Areas	
March Field (Air Reserve Base) Fire Department	BLS
Morongo (Tribe) Fire Department	BLS
Pechanga (Tribe) Fire Department	ALS

Source: Fire Department interviews

Notes: FR = First Responder

Figure 48 - First Responder Medical Service Level



volunteer fire department that began responding in 2012 to life-threatening medical calls. It is staffed primarily by first responders and some EMTs. There are no automated external defibrillators (AEDs) on their engines or chief officer vehicles.

Two fire departments, the Cities of Riverside and Corona have developed contractual partnerships with AMR to provide ALS fire engine first response. These agreements allow AMR to extend the ambulance response times by two minutes. Under this agreement, AMR financially compensates the fire departments based on the cost savings from the extended response times. However, Riverside City Fire Department is not contractually obligated to meet an ALS fire response-time standard and neither fire department publically reports their response times. REMSA has approved these partnerships based on ALS first-response-time requirements incorporated into the contracts. Figure 49 provides a summary of first responder contracts and revenue categories for two of these cities.

First Responder Contracts								
Service Area	Riverside City	Corona	Murrieta	Palm Springs	Temecula	Idyllwild	Riverside County Fire - Municipal	Riverside County Fire - Unincorporated
Response Times (90th Percentile)								
1st Responder ALS	9:59	9:59	N/A	N/A	N/A	N/A	N/A	N/A
Transport ALS	11:59	11:59	10:00	10:00	10:00	10:00	10:00	10:00
Fees/Penalties								
1st Responder ALS fee	\$1,322,076	\$558,140	None	None	None	None	None	None
Firefighter on ambulance \geq 2 times/24 hours*	\$100/call							
AMR false on-scene time	\$200							
Notes								
	Ambulance level of staffing required; fire stations can be used by provider	Based on per transport fee			Run by Riverside County Fire			

Source: Riverside County, AMR, and city agreements and amendments
 Note: This applies after 200 assists per year; which has never occurred

Figure 49 - First Responder Contracts

Through the interview process, the fire and EMS chiefs representing the different fire departments stated that the EMS system is working well overall. They also reported an excellent working relationship with the REMSA staff and are confident that issues are addressed timely. Certain areas of the County have local and Riverside County Fire Department resources stationed in close proximity to certain areas. However, the current EMS system does not necessarily assure the closest resource responds to incidents. This causes some inefficiencies, prolonged responses, and delayed patient assessments and treatments. The fire chiefs noted that other progressive EMS systems have implemented policies that the closest, most appropriate resource(s) is dispatched to the call regardless of service area boundaries.



9-1-1 Ambulance Providers – AMR, Idyllwild

The County contracted ALS emergency ambulance services, currently provided by AMR and the Idyllwild Fire Protection District (IFPD), to operate within the performance levels set by those agreements. These agreements utilize objective response-time criteria that are monitored, collected, analyzed and reported by REMSA. During focused group interviews, most stakeholder groups stated their belief that the providers generally perform well based upon the requirements contained in the current agreements. Comments made by stakeholders during the focus group interviews and broad stakeholder meetings also indicate there is a strong desire amongst stakeholders to see the performance standards and other requirements in the current ambulance agreements continue to improve. In 2004 and 2009, REMSA made some significant improvements in performance standards and system enhancement requirements through the Master Agreement for ALS Ambulance Services. Although improvements were made, many elements of the agreement remain as they were designed in the original 1998 contract. All subsequent agreements with fire departments for ALS first responder services, predominantly implemented in the system between 1999 and 2005, continue to be based upon and reference standards developed for that original 1998 agreement. Provider agency continuous quality improvement (CQI) program, ALS first responder support requirements and education/training requirements continue to reference concepts adopted in the original agreement as “system standards” (i.e., Schedule E of the Master Agreement for ALS Ambulance Services). This dynamic leaves the core of the current pre-hospital care system largely tied to elements of the 1998 Master Agreement for ALS Ambulance Services.

Forty years ago, there were a number of private ambulance companies providing 9-1-1 transport services within Riverside County. During the 1990s, they were purchased by either Laidlaw/MedTrans or AMR, which eventually merged to become one provider – AMR. The 9-1-1 provider contracts with the original companies were assumed through the acquisition process and continue to be in effect today (subject to amendments). Currently, AMR is the only private provider of 9-1-1 ambulance transports in Riverside County. There are a total of eight exclusive operating area (EOA) zones in Riverside County operated by AMR, all zones meet criteria for exclusivity under the Health and Safety Code, §1797.224 – Northwest, Southwest, Central, San Jacinto/Hemet, Pass, Mountain Plateau, Desert, and Palo Verde/Blythe. All zones have response-time standards and reports provided by REMSA that indicate AMR is in compliance.

The response-time standards are based on population density as specified by REMSA and broken into four geographical performance categories. The metro/urban service area standard is 9:59 minutes at least 90 percent of the time for emergency calls. Riverside and Corona cities have 11:59 minute response times due to the ALS first response programs established in these communities. This is an accepted practice in other EMS systems. Overall, the ambulance response-time standards are consistent with those established by other California EMS agencies although they are not as high performance as some benchmark communities (See Benchmark Section of this report).

When AMR does not meet the response-time standards on a particular call, a penalty is assessed for non-compliance. Penalties range from \$5 to \$2,000 based on the number of minutes late. AMR has the



ability to request mutual aid from the BLS ambulance providers but each request carries a \$500 penalty. There are also penalties assessed for not reporting on-scene times (i.e., \$360/call) and vehicle failure while transporting a patient (i.e., \$500/call). On a monthly basis, each zone must maintain a fractile response standard of 90 percent. If AMR falls below this amount the fines double (88-89.99 percent), triple (86-87.99 percent), or quadruple (less than 86 percent). Conversely, AMR can receive credit when a zone (or all zones) exceeds 91 percent (15 percent credit) and up to 95 percent (100 percent credit). When late response times exceed 10 minutes, there is no additional fine, but no zone performance credit is provided. These fines or "liquidated damages" are collected and redistributed to the jurisdiction where the late response occurred. Penalties assessed were \$449,013 and \$494,016 during 2011 and 2012, respectively.¹⁹

Idyllwild Fire Protection District (IFPD) operates in three zones and meets the criteria for exclusivity in Zone I pursuant to the Health and Safety Code, §1797.224. IFPD provides ambulance service under contract with the County within Idyllwild Zone I and to the two adjacent zones (Zone II – Pine Cove CSA 38 and Zone III – north of CSA 38). These areas are in a rural, isolated section of Riverside County. Two ALS ambulances are staffed at all times and a third ambulance is staffed on an as needed basis. There are approximately 500 transports in that community annually. A significant portion (i.e., 3-4/week) is flown by helicopter due to the mountain roads and a minimum 40-minute transport time. IFPD has established a letter of understanding (LOU) with AMR's Hemet Division to cover the Mountain Plateau Zone. This zone is geographically remote from the rest of AMR's operational area and contiguous to the Idyllwild Zone I. The public-private partnership appears to be a cost-effective solution for providing service for the low volume of calls in this zone.

In 1966, Springs Ambulance provided 9-1-1 transport services to Cathedral City. The City formed its own fire department in 1988 electing not to continue County coverage following an impending transition to CAL FIRE's contract to operate the Riverside County Fire Department (then called CDF). During this same time, the City assumed the 9-1-1 ambulance service from Springs Ambulance. It now staffs two ALS ambulances at all times which perform roughly 2,500 transports annually. The City relies on mutual aid from the AMR Palms Springs Division when its ambulances are committed. The State EMS Authority has determined that this operating area does not meet criteria for exclusivity pursuant to the Health and Safety Code, §1797.224.

Riverside County Fire Department provides 9-1-1 ambulance service in cities of Indio, Indian Wells, Palm Desert, and Rancho Mirage. Indian Wells, Palm Desert and Rancho Mirage comprise the Cove Cities Zone and meet criteria for exclusivity under the Health and Safety Code, §1797.224. The Cove Cities Zone also meet criteria under the Health and Safety Code, §1797.201. Indio is served by Riverside County Fire Department and has been determined by the State EMS Authority to not meet the criteria for exclusivity pursuant to the Health and Safety Code, §1797.224 due to their operations starting after 1981. The Cove Cities Zone has been in operation since 1980 when the voters approved a fire-tax measure to provide

¹⁹ Does not include Blythe Zone penalties



these services at no additional cost to their community. This operation does receive mutual aid primarily from AMR (and on rare occasions from Riverside County Fire Department; those interviewed thought the limited response by Riverside County Fire Department was due in part to this area being fully tax-funded). Riverside County Fire Department transports approximately 3,200 patients annually.

Air Ambulance Providers

There are three private helicopter EMS (HEMS) providers serving Riverside County – Mercy Air, with bases in Thermal and Hemet, REACH Air, out of Thermal (Thermal-area calls are rotated daily), and Tristate Careflight, based in Arizona, which serves Eastern Riverside County because it is closer than the other providers. Three public helicopter services also have the capability to transport, but are typically more involved with search and rescue and fire operations – Riverside County Fire Department, California Highway Patrol, and Riverside County Sheriff. The primary HEMS operators are required to have one paramedic and one registered nurse (or higher staffing); the rescue aircraft can be staffed by ALS, BLS, or only rescue staff. Figure 50 provides the volume of scene responses and transports reported by all HEMS providers to REMSA during 2010 and 2011. These transport numbers are 15-40 percent different than the transport volume identified through the HEMS quality improvement (QI) review process; REMSA may want to audit both data capture mechanisms to ensure accurate data is available.

Air Ambulance Emergency Volume					
Year	2012	2011	2010	2009	2008
Responses	639	402	440	-	315
Transports	237	258	153	156	175
% Transported	37%	64%	35%	-	56%

Note: 2009 data incomplete
Source: REMSA

Figure 50 - Air Ambulance EMS Volume

All requests for HEMS resources are managed by the Riverside County ECC for better coordination of air resources Countywide. There were varying opinions during the interview process on whether HEMS are simultaneously dispatched with ground resources to remote areas. The consensus was that the responding fire and transport resources as well as the County dispatch supervisor have the authority. However, this is not done consistently and there are no written policies for specific distances for simultaneous dispatch or type of call (e.g., trauma, pediatric). Some ground providers felt pressured not to use air resources based on the scrutiny placed on it by the 100 percent retrospective review process.

Similar to other counties, REMSA performs retrospective quality improvement on all transports to ensure proper utilization of air resources. REMSA currently audits 100 percent for not only appropriateness, but also landing zone safety, care and documentation, accurate estimate arrival times, and on scene times. For 2013, it is beginning to review extended ground transport times and inter-facility transfers following a ground ambulance transport to a local ED for possible opportunities to use HEMS more effectively.



Inter-facility Ambulance Providers

A total of 19 non-emergency ambulance providers offer BLS ambulance inter-facility transports (IFT) between healthcare facilities. There is significant variability on the volume of transports conducted by each provider within Riverside County. The City of Riverside establishes exclusivity through a City ordinance for ALS and BLS ambulance IFT. Other BLS providers have applied to the City of Riverside, but they have historically been denied based on not being able to demonstrate the “need and necessity” required by the City. The IFT data is available in Figure 51.

ALS IFT is part of each EOA. Only the EOA provider can offer ALS-level service within the EOA.

Ground Ambulance Interfacility Volume					
Type	2012	2011	2010	2009	2008
BLS transports	54,399	56,564	58,078	47,018	50,778
ALS transports	10,726	10,364	11,023	10,288	10,128
CCT transports	7,391	7,048	N/A	N/A	N/A
Total	72,516	73,976	69,101	57,306	60,906

Source: BLS, ALS- REMSA, CCT- providers, N/A = Not Available

Figure 51 - Ground Ambulance Inter-Facility Volume

There are nine ground ambulance providers offering

Ground Ambulance Interfacility Revenue				
Transport Type	2012		2011	
	Transports	Net Revenue	Transports	Net Revenue
BLS	54,399	\$ 18,671,314	56,564	\$ 19,414,405
ALS	10,726	\$ 4,246,289	10,364	\$ 4,102,978
CCT	7,391	\$ 6,915,485	7,048	\$ 6,594,553
Total	72,516	\$ 29,833,089	73,976	\$ 30,111,936

Transport Source: BLS, ALS- REMSA, CCT- providers
Net Revenue Assumption: Based on local Medicare allowables, average 10 mile transport, and 15 percent increase

Figure 52 - Ground Ambulance Inter-Facility Revenue

inter-facility nurse critical care transportation (CCT). Providers utilize either a dedicated CCT ambulance with a nurse and EMT or a BLS ambulance with a nurse who meets the ambulance at the sending hospital with the CCT supplies and equipment. Figure 52 identifies the CCT volume during the last two years.

The Riverside Chapter Board of the California Association of Healthcare Facilities (CAHF) was interviewed as part of the EMS strategic process as well as a sampling of other long term care facilities that use IFT. They reported a good working relationship with the different IFT providers and stated response times are good including Riverside City, where AMR is the only provider. Some facility charge nurses mentioned ambulance crews making negative comments about the need for transport, but this appears to be more related to the 9-1-1 ambulance crews.

The current IFT market is non-exclusive and there a number of ambulance companies competing for the BLS and CCT transports as mentioned above. There is one exception, the City of Riverside, through City ordinance, has created a franchise through city ordinance.²⁰ AMR is currently the only provider and while other ambulance companies have applied, they have not been approved up to this time period. Figure 52 demonstrates the number of transports and estimated net revenue during the last two years.

²⁰ The City of Riverside has a longstanding City ordinance (City Ordinance 4768) that seeks to permit and establish control over the number and extent of ambulance providers within that city.



Advanced EMT

The Advanced EMT (AEMT) certification represents an EMT with the ability to perform limited airway devices and medication administration. It was first articulated in the 1996 EMS Agenda for the Future and further defined by the 2000 EMS Education Agenda for the Future: A System Approach. The California EMS Authority (EMSA) released the initial AEMT policy in 2010 and updated in 2012 to match the National EMS Education Standards and require National Registry EMT testing. However, EMSA allows each local EMS agency (LEMSA) to determine whether it will recognize AEMT within each jurisdiction. To date, three LEMSAs have decided to approve AEMT as a certification level – Sierra-Sacramento, Mountain Valley, and Imperial.

While Riverside County does not currently have an AEMT program, the AEMT program is included in the County's medical protocols. The vast majority of the County, both cities and unincorporated areas, are being served by paramedics. If REMSA were to add AEMT certification, it would most likely not improve the level of EMS care provided in most zones. However, REMSA may want to talk with non-ALS first responders for a potential opportunity to use AEMTs. Some ALS agencies may also want to determine field provider interest in AEMT as an opportunity to better support the existing paramedics.



Review of Ambulance Performance, EOAs and Sub-Zones

The process for establishing ambulance Exclusive Operating Areas (EOAs) has been established by state law for the purpose of identifying a single (exclusive) provider, thereby restricting trade and thus must comply with state legal requirements to qualify a county for state anti-trust immunity. There are 12 major zones in the Riverside County EMS plan, ten are EOAs and two are non-exclusive operating areas. Five of the ten major zones are further subdivided into response-time subzones. Development of response subzones has been necessary as population and EMS call volume has grown. However, there have been no significant changes to EOA boundaries or the “manner and scope” to which the grandfathered providers have provided continuous, uninterrupted service since January 1, 1980.²¹

Figure 53 describes the ambulance zones; any sub-zones incorporated in the zone; whether or not it is exclusive and the service provider for the zone. There are a total of 12 zones and 15 sub-zones. These zones (and sub-zones) either follow a historical provider’s service area or the jurisdictional boundaries of the municipal service providers.

The Abaris Group reviewed each of the zones (and sub-zones) in this portion of the report, and provides analysis and observations on each.

²¹ “Manner and Scope” are terms used by the California EMS Authority to describe a threshold of change for an EOA for which that EOA loses their H&S 201 or 224 exclusivity rights and must be competitively bid to regain the EOA’s exclusivity.



Riverside County Ambulance Zones			
Zone Name	Subzones Included	Exclusive (Yes or No)/Provider	Geographic Description
Central Zone	Central Unincorp. South, Moreno Valley	Yes/AMR	Cities of Moreno Valley and Perris and surrounding unincorporated areas.
Desert Zone	Desert Unincorp., Palm Springs and Desert Hot Springs, La Quinta-Coachella, (and contains Coves Cities, Cathedral City, Indio City)	Yes/AMR	Cities of Palm Springs, Desert Hot Springs, La Quinta, Coachella, and surrounding unincorporated areas east of Desert Center.
Northwest Zone	N. Norco/NW Unincorp., S. Corona/NW Unincorp., Riverside City	Yes/AMR	Cities of Riverside, Corona, Eastvale, Jurupa Valley, Norco and the surrounding unincorporated areas.
Pass Zone	None	Yes/AMR	Cities of Banning, Beaumont, Calimesa and surrounding unincorporated areas.
Mountain Plateau Zone	None (Idyllwild City Zones fall within)	Yes/AMR	Mountain Plateau area except the communities of Idyllwild and Pine Cove.
Southwest Zone	SW Unincorp 01, Murrieta-Temecula	Yes/AMR	Cities of Canyon Lake, Lake Elsinore, Menifee, Murrieta, Temecula, Wildomar and the surrounding unincorporated areas.
San Jacinto Valley / Hemet Zone	San Jacinto Unincorp., Hemet	Yes/AMR	Cities of San Jacinto, Hemet and the surrounding unincorporated areas.
Palo Verde Valley Zone	None	Yes/AMR, dba Blythe Ambulance	City of Blythe and the surrounding unincorporated areas in the Palo Verde Valley region from state and county boundaries west to Desert Center.
Idyllwild Fire Protection District (IFPD)	IFPD Subzones I, II and III	Subzone I - Yes/IFPD Subzones II and III - No/IFPD	Idyllwild Fire Protection District
Cathedral City Zone	None	No/Cathedral City Fire Department	Cathedral City
Indio City Zone	None	No/RivCo Fire-Cal Fire	City of Indio
Coves Cities Zone	None	Yes/RivCo Fire-Cal Fire	Cities of Indian Wells, Palm Desert and Rancho Mirage.

Source: Riverside County EMS Plan, 2012 Draft Update

Figure 53- Riverside County Ambulance Zones



EOA/Zone Configuration

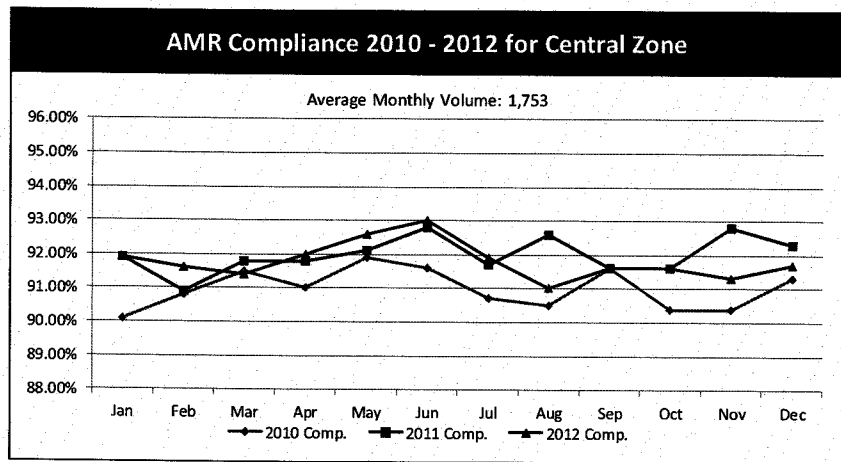
The Abaris Group typically uses a combination of factors when evaluating an EMS EOAs and Zones. The factors include:

- Geographic barriers to access within the zone
- Hospitals within the zone (i.e., destination options)
- Population density
- Total annual EMS responses within the zone
- Total population of the zone
- Transportation access within the zone
- Other considerations when relevant to REMSA

Depending on the preferences of the governing body and the qualifications of the county area(s) being examined, a determination also needs to be made with regard to the size and scope of exclusive zones, response time compliance zones, etc. Another area of evaluation is the impact of zone development on smaller communities within the zone. In zones with a large metropolitan area, response time compliance in the smaller communities can fall to unacceptable levels without necessarily being reflected in the zone compliance, due to the large number of [presumably on-time] responses within the large metropolitan area. This will be examined further during the individual zone reviews, below.

Central Zone

The Central Zone includes the cities of Moreno Valley (population 193,365) and Perris (population 68,386) and surrounding unincorporated areas including the communities of Nuevo (population 6,447) and Lakeview (population 2,104).²² The total estimated population of the Central Zone is 316,180.²³ Subtracting the population of the two incorporated cities, the unincorporated population within the Central Zone is estimated at 54,429.



Source: Riverside EMSA Compliance Data

Figure 54 - AMR Compliance 2010-2012 for Central Zone

²² All population numbers are based on the 2010 U.S. Census

²³ Estimates are calculated using Census Block Groups. Where a Census Block Group extends beyond the boundary of a zone, the percentage of the total Block Group population within each zone is estimated, based on underlying infrastructure.



Central Zone Determination – Exclusive (Grandfathered)

Goodhew Ambulance Service provided emergency ambulance services to the Central Zone since the 1970s. In 1995, Laidlaw/MedTrans purchased Goodhew Ambulance Service and then merged with AMR in 1997. The Central Zone exclusivity was established via the “grandfathering” provisions of California Health and Safety Code, §1797.224, as the County established that AMR and its predecessor companies maintained uninterrupted service in the same scope and manner since prior to January 1, 1981. Riverside County entered into a contract with AMR in September, 1998 for the Central Zone and six other zones.

As noted in Figure 54, the Central Zone averages 1,753 responses per month, based on a three-year average from 2010-2012. This volume ranged from a high in August, 2012 of 2,070 responses to a low in February, 2010 of 1,525. There are two sub-zones within the Central Zone, the Central Unincorporated South Sub-zone (average monthly responses = 693), and the Moreno Valley Sub-zone (average monthly responses = 1,060). The Central Unincorporated South Sub-zone contains all of the Central Zone except for the city of Moreno Valley. See Figure 55 for the map layout of these sub-zones. In addition to the city boundaries and zones, Figure 55 displays highways, interstates, hospital locations and, more importantly, the population density of the Central Zone, based on Census Block Groups (i.e., 2010 Census).

Central Zone with Sub-Zones

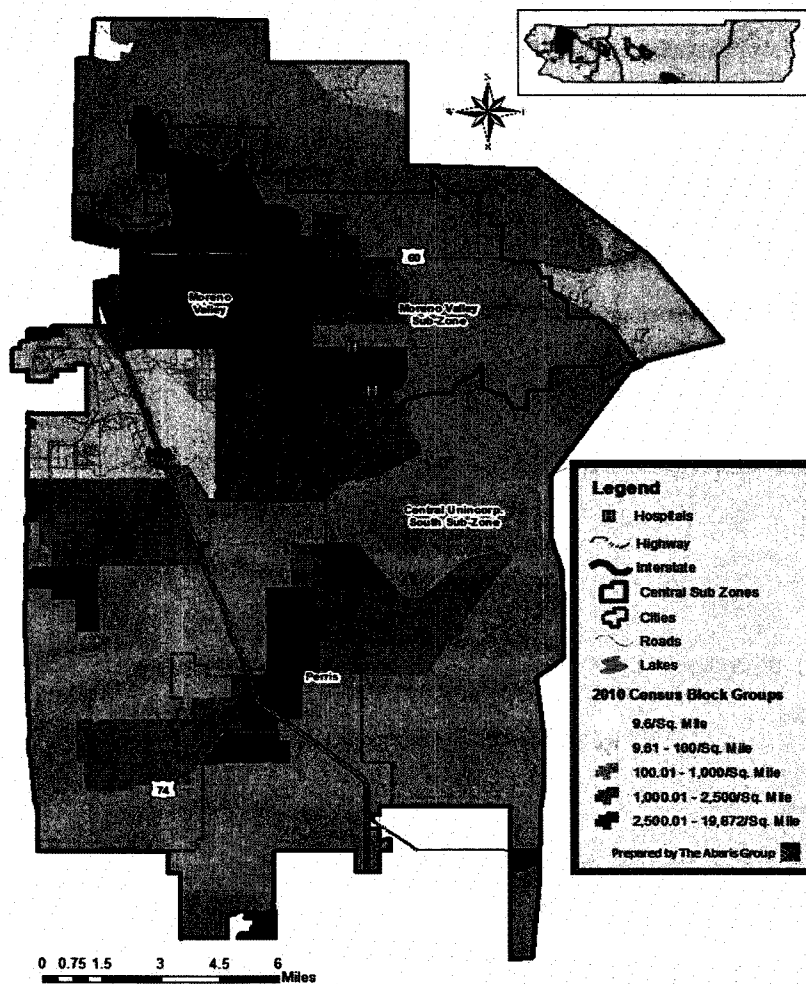


Figure 55 - Central Zone with Sub-Zones

Based on these considerations, The Abaris Group finds that the Central Zone has historically been appropriately designed and configured to function as a stand-alone zone for the purpose of conducting response time compliance analysis.



Desert Zone

The Desert Zone includes the cities of Cathedral City (population 51,200), Palm Springs (population 44,552), Rancho Mirage (population 17,218), Desert Hot Springs (population 25,938), Palm Desert (population 48,445) Indian Wells

Desert Sub-Zone Detail			
Sub-Zone Name	Geographic Description	Exclusive (Yes or No)/Provider	Population Served
Desert Unincorporated with Coachella and La Quinta	Cities of Coachella and La Quinta with the unincorporated areas extending to Desert Center.	Yes/AMR	212,216
Palm Springs & Desert Hot Springs	Cities of Palm Springs & Desert Hot Springs	Yes/AMR	70,490
Cathedral City Zone	Cathedral City	No/Cathedral City Fire Department	51,200
Indio City Zone	City of Indio	No/RivCo Fire-Cal Fire	76,036
Coves Cities Zone	Cities of Indian Wells, Palm Desert and Rancho Mirage	Yes/RivCo Fire-Cal Fire	70,621

Source: Riverside County EMS Plan, 2012 Draft Update and US Census Bureau

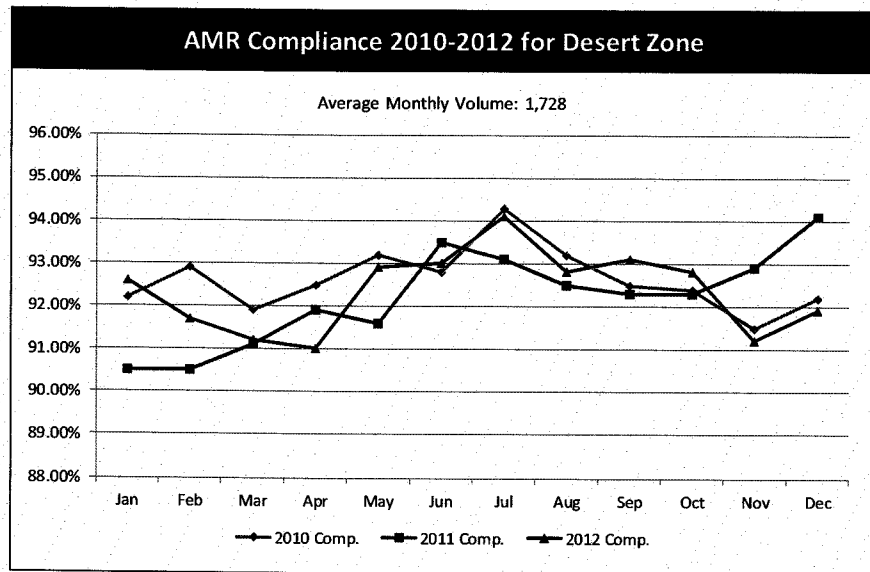
Figure 56 - Desert Sub-Zone Detail

(population 4,958), Indio (population 76,036), La Quinta (population 37,467) and Coachella (population 40,704). The overall population of the Desert Zone is estimated at 480,563. After subtracting the incorporated city populations, the population of the unincorporated area is estimated at 134,045. It is important to note that the cities of Cathedral City, Indio and Cove Cities are served by separate providers and are sub-zones within the greater Desert Zone.

There are five sub-zones within the Desert Zone, most of which are clustered along the western region of the zone, near Interstate 10 (see Figure 56 for description).

Desert Zone Determination – Exclusive (Grandfathered)

Springs Ambulance Service provided emergency ambulance services to the Desert Zone from 1966 to 1996. In 1996, AMR purchased Springs Ambulance Service, and then merged with Laidlaw/MedTrans in 1997. The Desert Zone exclusivity was established via the “grandfathering” provisions of California Health and Safety Code, §1797.224, as the County established that AMR and its predecessor



Source: Riverside EMSA Compliance Data

Figure 57 - AMR Compliance 2010-2012 for Desert Zone

companies maintained uninterrupted service in the same scope and manner since prior to January 1, 1981. Riverside County entered into a contract with AMR in September, 1998 for the Desert Zone and six other zones.



Desert Zone and Sub-Zones

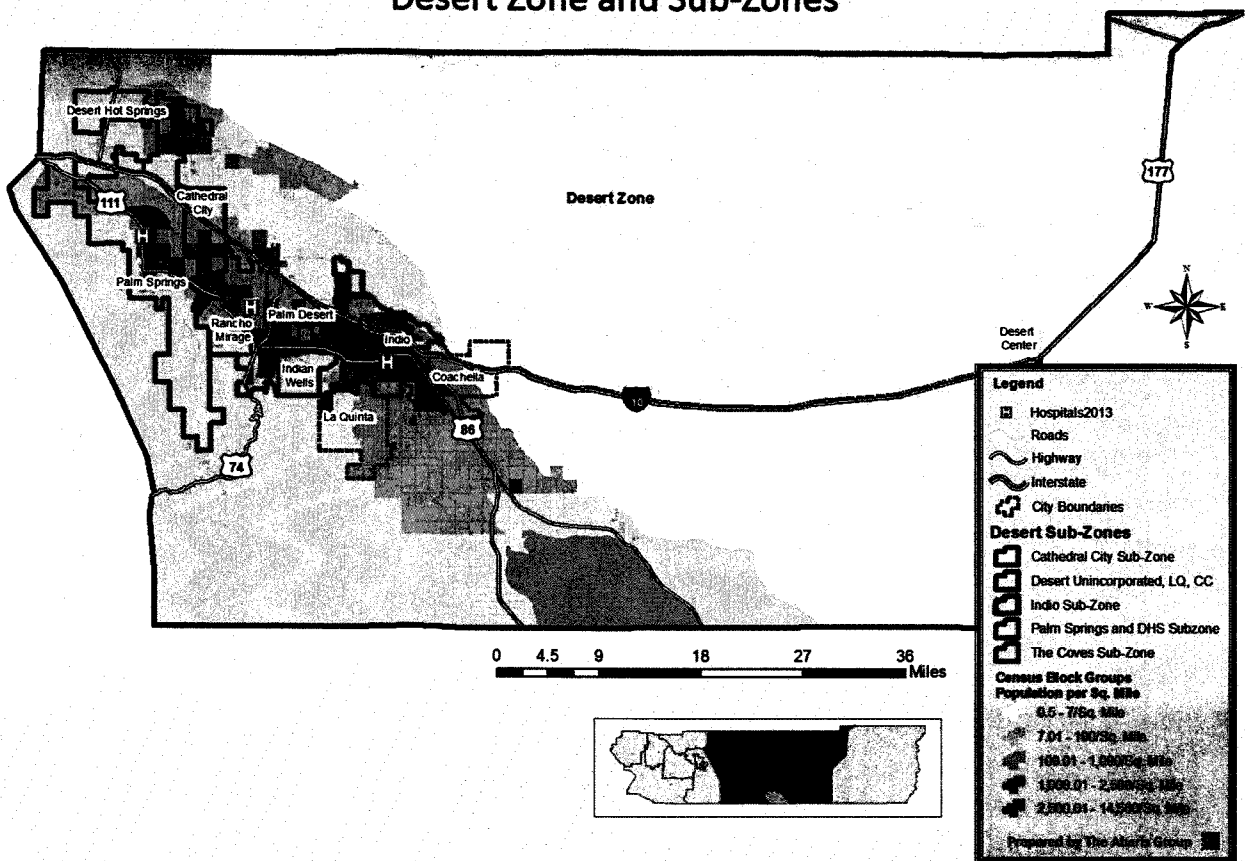


Figure 58 - Desert Zone and Sub-Zones

The Desert Zone is the largest of the zones, and is approximately 4,486 square miles in area, constituting 62.2 percent of the entire County, while containing only about 22 percent of the population. While the western portion of the Interstate 10 corridor is fairly densely populated, most of the remainder of the zone constitutes a wilderness population density. Much of this wilderness area has few roads, and access to many areas is very restricted. As such, nearly 80 percent of this zone has a required response time of 59 minutes and 59 seconds or faster.

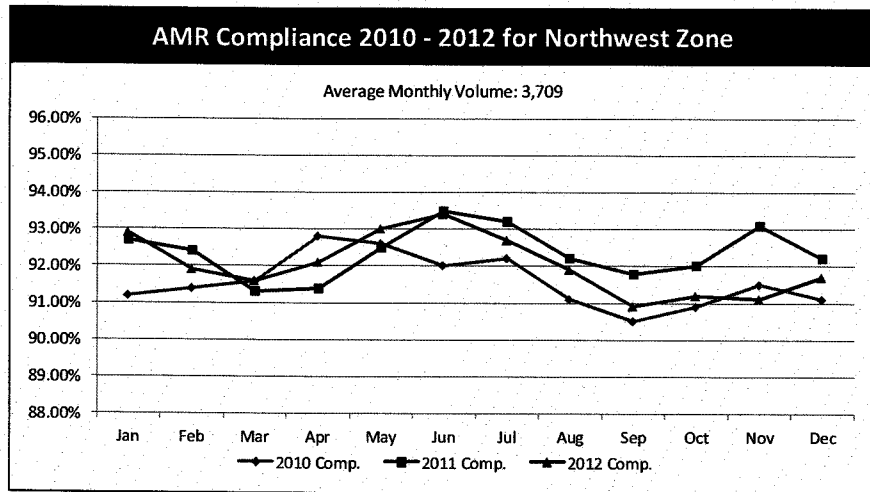
The configuration of this zone and its sub-zones is not ideal from the standpoint of the County franchise or zone coverage. With the Coves Cities, Cathedral City and Indio sub-zones carved out of this very large zone, approximately 198,000 in population (41 percent of the zone population) is served by alternate providers and unavailable to the County contractor, requiring them to cross “dead space” when responding through these sub-zones for calls within its areas of service. This large area of “carve-outs” also creates a sizeable hole in a deployment plan for the populated areas of the zone. Using an estimated utilization rate of 70 responses per 1,000 population,²⁴ this equates to a loss to the franchise of approximately 13,860 responses annually. This becomes more important when one considers the remaining remote to wilderness areas that must be served by the contractor.

²⁴ Estimated using 2.2 million in population and an average of 156,000 responses annually.



Northwest Zone

The Northwest Zone contains the cities of Riverside (population 303,871), Corona (population 152,374), Norco (population 27,063), Eastvale (population 53,670), Jurupa Valley (population 95,004) and the surrounding unincorporated areas (population estimate 86,337). The zone also contains three sub-zones; the Riverside City Sub-zone (population 303,871), the Northwest Unincorporated North Norco Sub-zone (population approximately 191,500 containing the cities of Norco, Eastvale and Jurupa Valley) and the Northwest Unincorporated South Corona Sub-zone (population approximately 222,400 containing the City of Corona and surrounding unincorporated areas).



Source: Riverside EMSA Compliance Data
Figure 59 - AMR Compliance 2010-2012 for Northwest Zone

Northwest Zone Determination – Exclusive (Grandfathered)

Goodhew Ambulance Service provided ALS ambulance services to the Northwest Zone from the 1970s to 1995. In 1995, Laidlaw/MedTrans purchased Goodhew Ambulance Service, and then merged with AMR in 1997, with no interruption in services. The Northwest Zone exclusivity was established via the “grandfathering” provisions of California Health and Safety Code, §1797.224, as the County established that AMR and its predecessor companies maintained uninterrupted service in the same scope and manner since prior to January 1, 1981.

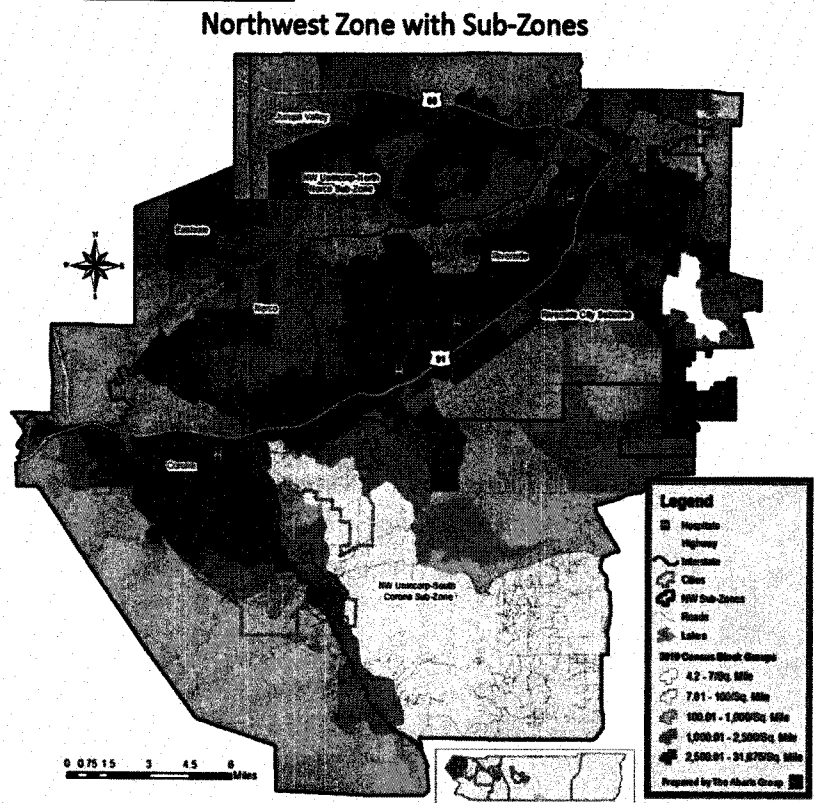


Figure 60 - Northwest Zone with Sub-Zones

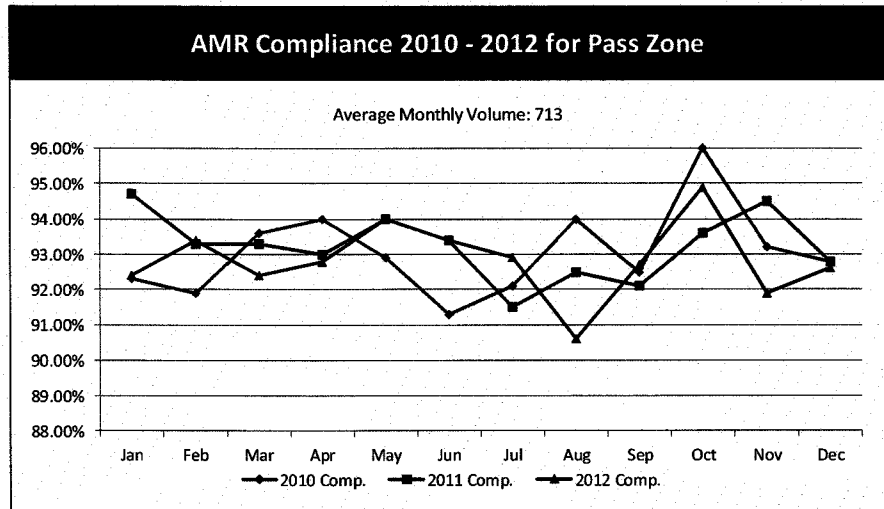


The Northwest Zone has the highest call volume of all the Riverside County zones, averaging 3,709 responses per month, averaged over calendar years 2010-2012. The Riverside City Sub-zone averages 1,913 responses per month with an average response time compliance of 92.1 percent. The Northwest Unincorporated North Norco Sub-zone averages 836 responses per month with an average response time compliance of 91.6 percent. Finally, the Northwest Unincorporated South Corona Sub-zone averages 958 responses per month with an average response time compliance of 91.8 percent.

The Northwest Zone contains primarily metropolitan/urban population densities, and maintains most areas with response-time requirements of 9:59 or better. Based on the previously referenced zone configuration standards, The Abaris Group finds that the Northwest Zone has historically been configured to conduct response-time compliance analysis, particularly when broken out to the sub-zone analysis.

Pass Zone

The Pass Zone is comprised of the incorporated cities of Beaumont (population 36,877), Banning (population 29,603) and Calimesa (population 7,879) and surrounding unincorporated areas (population estimate 14,436). There are no sub-zones within the Pass Zone, and all areas of the zone are served by AMR.



Source: Riverside EMSA Compliance Data

Figure 61 - AMR Compliance 2010-2012 for Pass Zone

Pass Zone Determination – Exclusive (Grandfathered)

Lifecare Medical Transport (LMT) provided ALS ambulance services to the Pass Zone from prior to 1981 until 1996. In 1995, the County began a Request for Proposal (RFP) process. However, a US District Court preliminary injunction was granted to LMT based on its contention that the RFP and the 1994 EMS Plan violated its rights to be grandfathered pursuant to Health and Safety Code §1797.224 and the RFP process was halted at that time. In 1996 AMR purchased LMT. Following the sale, AMR agreed to drop the lawsuit if the Pass Zone was granted exclusivity under the grandfather provisions of California Health and Safety Code §1797.224. The County agreed and the Pass Zone maintains exclusivity through a written contract with the County.

Based on the total volume, population base, transportation access and overall size of the Pass Zone, The Abaris Group finds it adequate for the purpose of response time compliance analysis.



Pass Zone

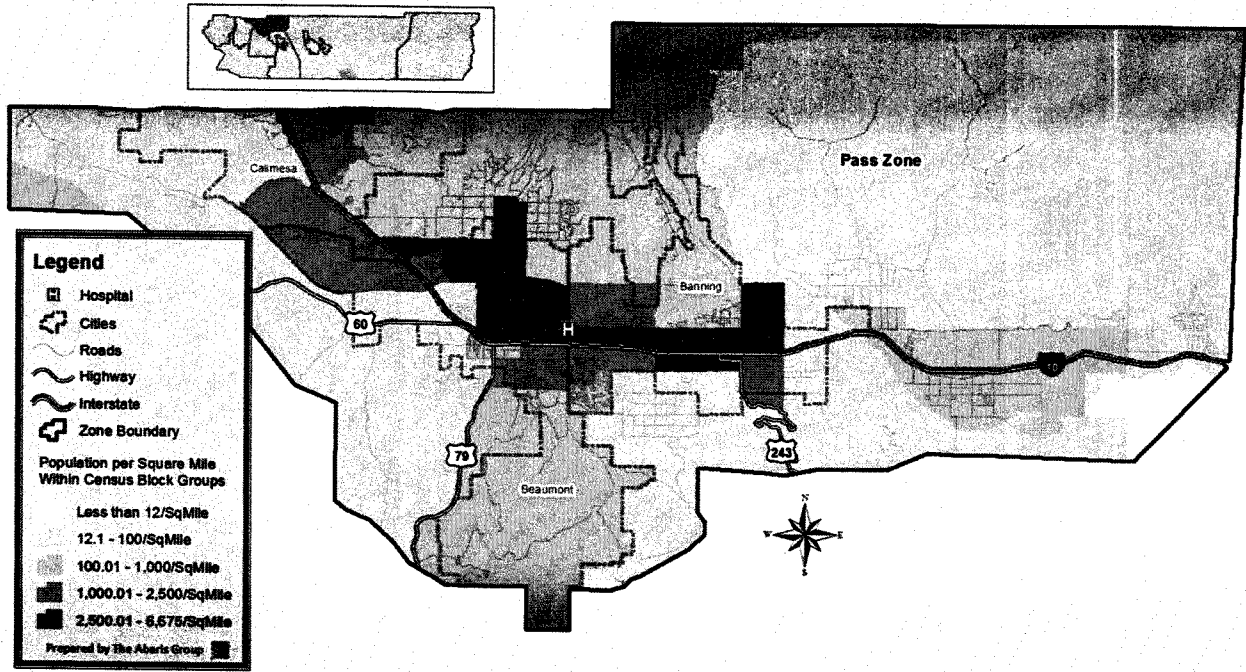
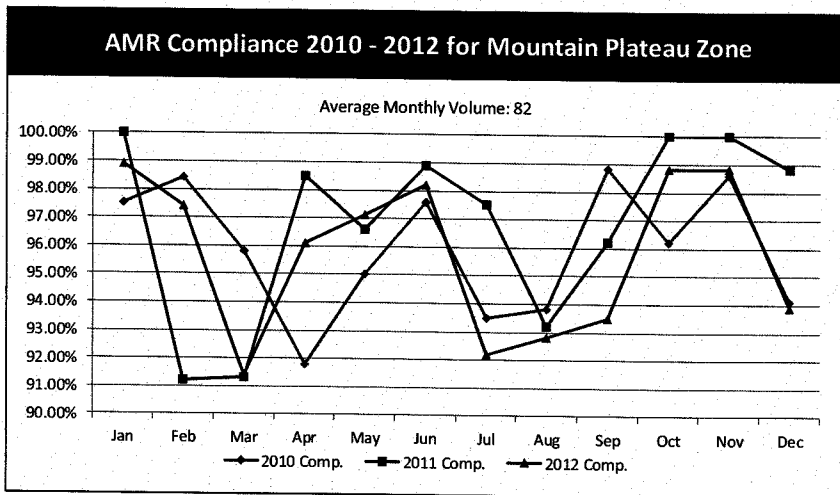


Figure 62 - Pass Zone

Mountain Plateau Zone

The Mountain Plateau Zone contains no incorporated cities, but has five unincorporated communities of note; Idyllwild, Pine Cove, Garner Valley, Pinyon, and Anza. The US Census Bureau has defined Idyllwild-Pine Cove as a single census-designated place (CDP). The population of the CDP was 3,874 at the 2010 census, up from 3,504 as of the 2000 census. The 2010 population of the Anza CDP was 3,014. The overall population of the Mountain Plateau Zone is estimated at 14,392, based on 2010 Census Block data.



Source: Riverside EMSA Compliance Data

Figure 63 - AMR Compliance 2010-2012 for Mountain Plateau Zone



Mountain Plateau Zone

Hemet Valley Ambulance Service provided ALS ambulance services to the Mountain Plateau Zone from the 1970s to 1995. Careline Ambulance won a competitive bid (RFP) in 1995. Careline was purchased by Laidlaw/MedTrans in 1995, which then merged with AMR in 1997. In September 1998, REMSA established its first agreement contract with AMR to provide emergency ambulance service to the Mountain Plateau Zone. Currently, AMR is serving this area pursuant to an agreement with Riverside County. It has been more than ten years since the last RFP for the zone.

The Mountain Plateau Zone has very low volume, with an AMR average monthly volume of just 82 calls. Even if one factors in the monthly volume of the Idyllwild Fire Protection District of 49 calls per month, the overall zone volume is only 131 calls per month.

From the standpoint of response-time compliance analysis, this leaves very little room for error, which is illustrated by Figure 63, with response times varying on a month to month basis. There appear to be few options from the standpoint of geographic consolidations, as merging this zone with a neighboring zone could have a negative impact on the response-time performance of this low volume zone. The possibility includes consideration of extending the compliance analysis period to bi-monthly or even quarterly, to allow sufficient volume to exclude normal month-to-month variation that would not create an unrealistic and statistically invalid shift in compliance analysis.

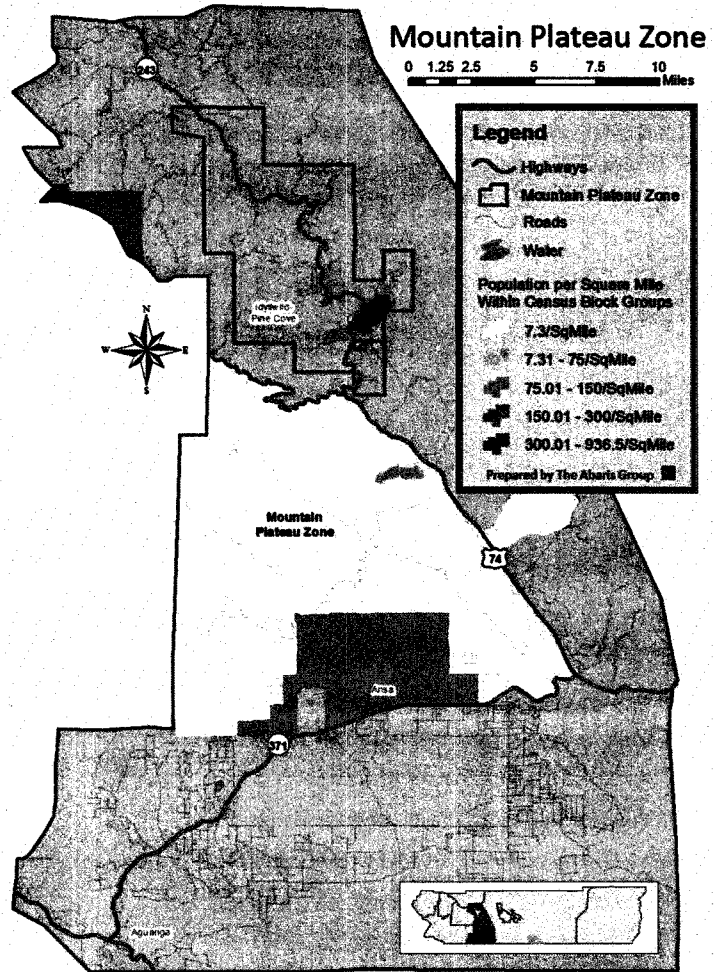


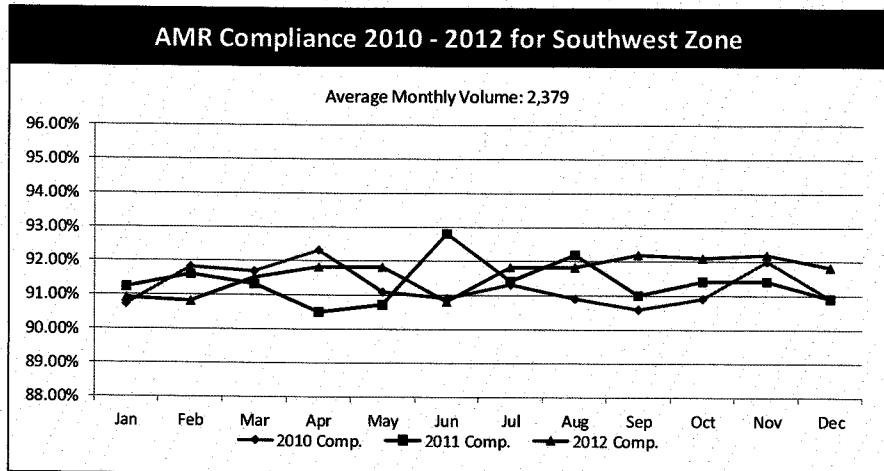
Figure 64 - Mountain Plateau Zone



Southwest Zone

The Southwest Zone has an estimated population of 474,981 and is made up of the incorporated cities of Canyon Lake (population 10,561), Lake Elsinore (population 51,821), Menifee (population 77,519), Murrieta (population 103,466), Temecula (population 100,097), Wildomar (population 32,176) and the surrounding unincorporated areas (population estimate 99,341).

The Southwest Zone is also comprised of two sub-zones; The Murrieta-Temecula Sub-zone and the Southwest Unincorporated Sub-zone. The Murrieta-Temecula Sub-zone consists of the two incorporated cities and has a population of 203,563; an average monthly response volume of 1,006 and an average response time compliance



Source: Riverside EMSA Compliance Data
Figure 65 - Compliance for Southwest Zone

of 92.3 percent. The Southwest Unincorporated Sub-zone consists of the remaining incorporated cities and surrounding unincorporated area and has a population of 271,418; an average monthly response volume of 1,373 and an average response time compliance of 90.7 percent.

Southwest Zone Determination – Exclusive

In 1984, Goodhew Ambulance Service bought John’s Ambulance serving Lake Elsinore and parts of Murrieta. In 1985, Goodhew bought Sun City Ambulance Service serving unincorporated areas in the Southwest Zone. In 1995, Laidlaw/MedTrans purchased Goodhew Ambulance Service and then merged with AMR in 1997, with no interruption in service. REMSA determined that ALS ambulance service delivery to this zone was consistent with the standards required under Health and Safety Code, §1797.224 for “grandfathering” as an EOA.

With the existing population base, population density, call volume, transportation access and available hospital resources, The Abaris Group finds that this zone has historically been adequate for the purpose of response-time compliance analysis.

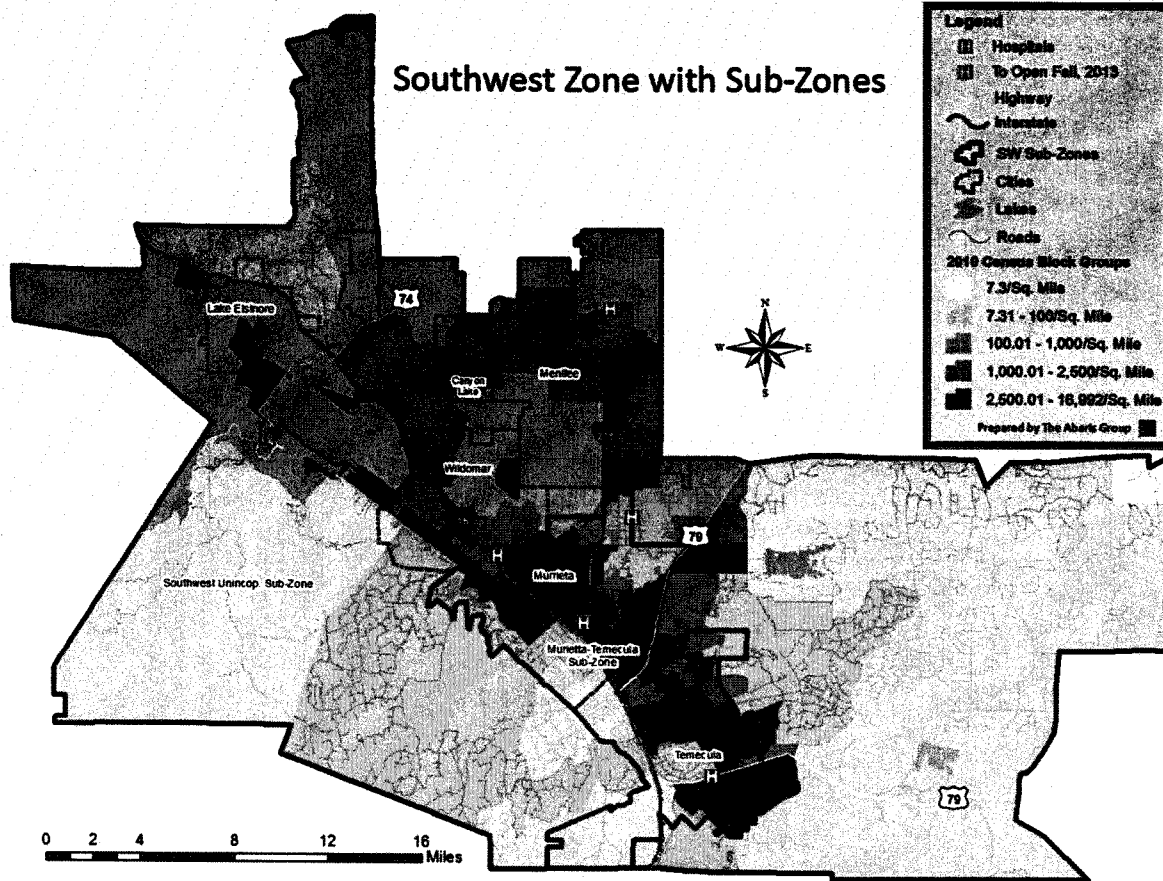
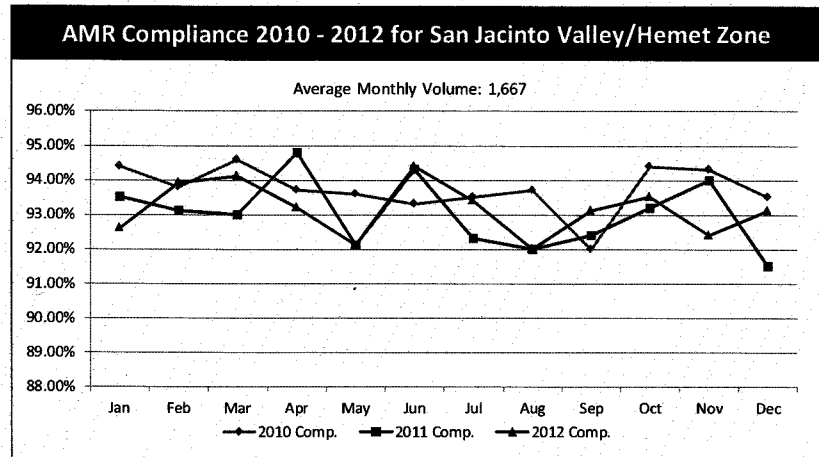


Figure 66 - Southwest Zone with Sub-Zones

San Jacinto Valley/Hemet Zone

The San Jacinto Valley/Hemet Zone contains the incorporated cities of San Jacinto (population 44,199) and Hemet (population 78,657) and the surrounding unincorporated areas (population estimate 55,268). There are two sub-zones within the San Jacinto Valley/Hemet Zone; The Hemet Sub-zone (population 78,657), which has a monthly average response volume of 1,048 and an average response time



Source: Riverside EMSA Compliance Data

Figure 67 - AMR Compliance 2010-2012 for San Jacinto Valley/Hemet Zone

compliance of 93.5 percent, and the San Jacinto Unincorporated Sub-zone (population estimate 99,467), which has an average monthly response volume of 619, with an average response time compliance of 92.9 percent.



San Jacinto Valley/Hemet Zone Determination – Exclusive

Hemet Valley Ambulance Service provided ALS ambulance services to the San Jacinto Valley Zone from the 1970s to 1997. In 1997, Laidlaw/MedTrans purchased Hemet Valley Ambulance Service and then merged with AMR with no interruption in service.

The REMSA determined that ALS ambulance service delivery to this zone was consistent with the standards required under Health and Safety Code, §1797.224 for “grandfathering” as an EOA.

With the existing population base, population density, call volume, transportation access, The Abaris Group finds that this zone has been adequate for the purpose of response-time compliance analysis. It is notable that there is a substantial difference in volume between the two sub-zones, and it would be justified to evaluate the configuration of these sub-zones to better distribute the volume equitably.

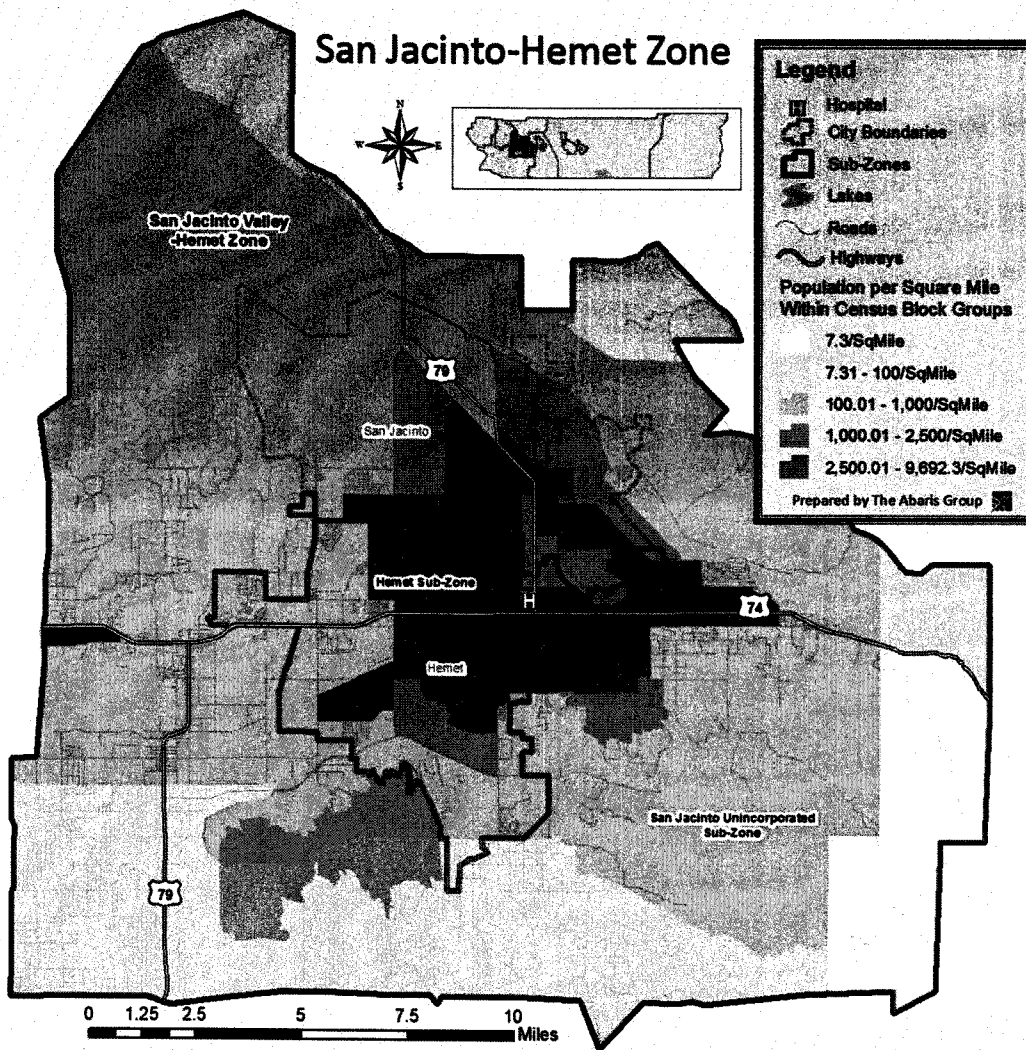
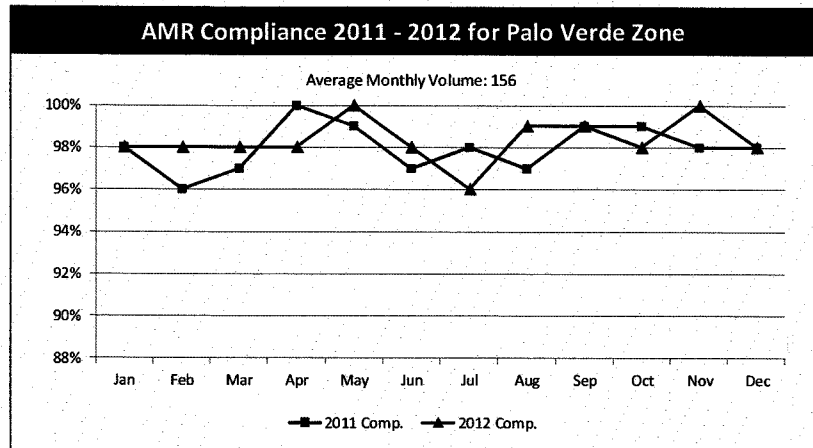


Figure 68 - San Jacinto-Hemet Zone



Palo Verde Valley Zone

The Palo Verde Valley Zone contains the incorporated city of Blythe (population 20,817), and surrounding unincorporated areas (population estimate 3,028), stretching from the Eastern-most edge of the County to Desert Center. The zone is extremely isolated and very sparsely populated. Blythe lies at the border with Arizona, and more than 165 miles from the City of Riverside. There are no sub-zones within the Palo Verde Valley Zone, and nearly 90 percent of the zone is designated as a "Best Effort" response time requirement, due to its isolation and very limited roadway access.



Source: Riverside EMSA Compliance Data

Figure 69 - AMR Compliance 2011-2012 for Palo Verde Zone

Palo Verde Zone Determination – Exclusive

Blythe Ambulance Service has been providing emergency ambulance services from 1979 to the present. On July 1, 2002, Blythe Ambulance Service entered into its first contract with Riverside County to provide emergency ambulance services for the Palo Verde Valley Zone. On January 1, 2011 AMR finalized the purchase of Blythe Ambulance Service, with no interruption in services. The REMSA determined that ALS ambulance service delivery to this zone was consistent with the standards required under Health and Safety Code, §1797.224 for "grandfathering" as an EOA. Riverside County Fire Department provides three ALS assessment engines in Palo Verde Valley, which supplement the EMS service.

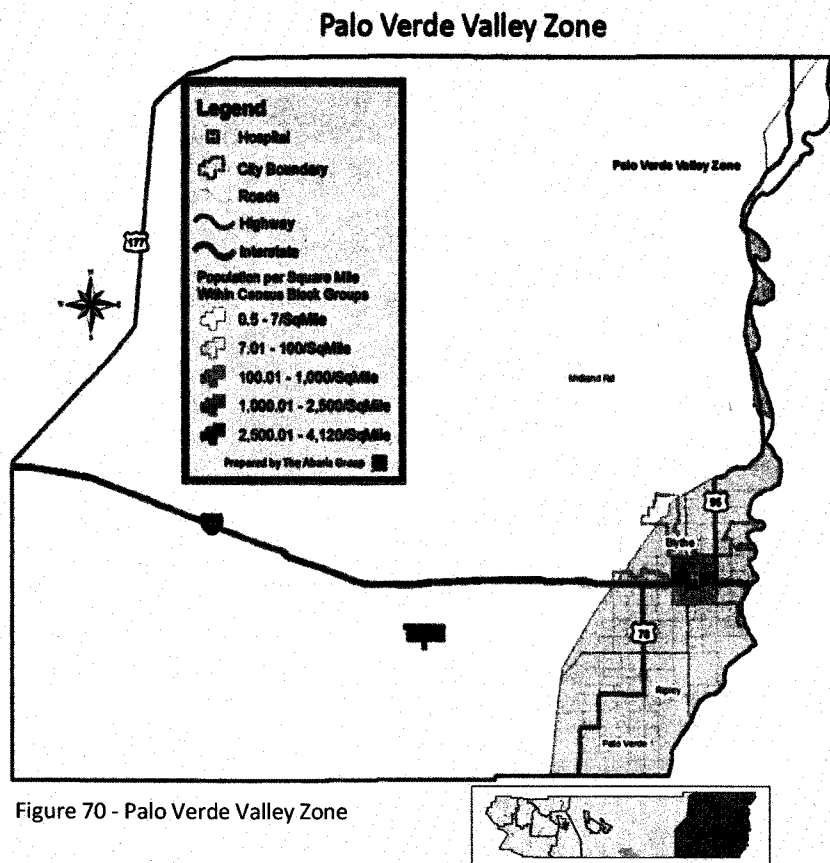


Figure 70 - Palo Verde Valley Zone

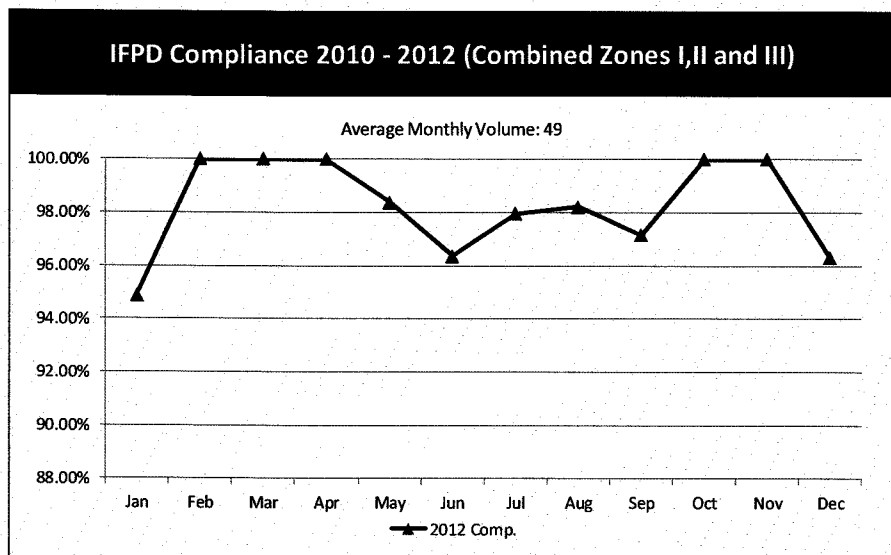


It is difficult to describe the Palo Verde Valley Zone as “adequate” for the purpose of response time compliance analysis, as its monthly volume is quite low and most areas of the zone have a simple “best-effort” response-time expectation. There are few options for reconfiguring this zone, due to its location and isolation within the County and its overall population and low density.

Idyllwild Fire Protection District (IFPD) Zone

There are three areas called zones (I, II and III) serviced by IFPD. Zone I is the IFPD boundaries and recognized by the County as its EOA under Health and Safety Code, §1797.224. Zones II (Pine Cove – CSA-38) and Zone III (north of CSA-38) are actually County areas that are part of the Mountain Plateau Zone. When the bid for the Mountain Plateau Zone was awarded in the 1990s, the contractor defaulted and the Mountain Plateau Zone then went to the County ambulance contractor except for Zones II and III, which the County entered into an agreement with IFPD to serve.

The IFPD Zone contains no incorporated cities, but does contain the Idyllwild-Pine Cove census-designated place and is located in the San Jacinto Mountains, within the Mountain Plateau Zone. Calculating the population of the IFPD is a bit complicated, due to the very rural and sparsely populated nature of the area (i.e., it only contains three census block groups), and the District is estimated at 3,100. However, during the summer tourist season, the population can more than double.



Source: Riverside EMSA Compliance Data
Figure 71 - IFPD Compliance 2010-2012 (Combined Zones I, II, and III)

The three IFPD zones combine for an average response volume of 49 calls per month, and their monthly compliance analysis averages approximately 98.2 percent.

Idyllwild Fire Protection District (IFPD) Zone Determination – Exclusive

IFPD has been providing uninterrupted ALS ambulance services since 1980. IFPD entered into its first contract with Riverside County for ALS ambulance services on July 1, 1997. REMSA determined that ALS ambulance service delivery to IFPD Zone I was consistent with the standards required under Health and Safety Code, §1797.224 for “grandfathering” as an EOA. Zones II and III are non-exclusive.



As noted in other low volume zones, it is difficult to justify carving out isolated areas within low-volume zones for separate service delivery; however, in these difficult to serve areas, there are some advantages in using a tax-supported operation to supplement the limited revenue generated by ambulance transports.

Cathedral City Zone

The Cathedral City Zone contains only the incorporated city of Cathedral City (population 51,200). It is surrounded by Rancho Mirage to the Southeast, and Palm Springs to the West.

Cathedral City Zone Determination – Non-exclusive

Cathedral City was originally served by Springs Ambulance Service from 1966 to 1988. Cathedral City Fire Department began providing ALS ambulance service to its city in 1988, and therefore does not qualify for the specifications of Health and Safety Code, §1797.224.

No data has been provided to The Abaris Group for analysis of the Cathedral City Zone.

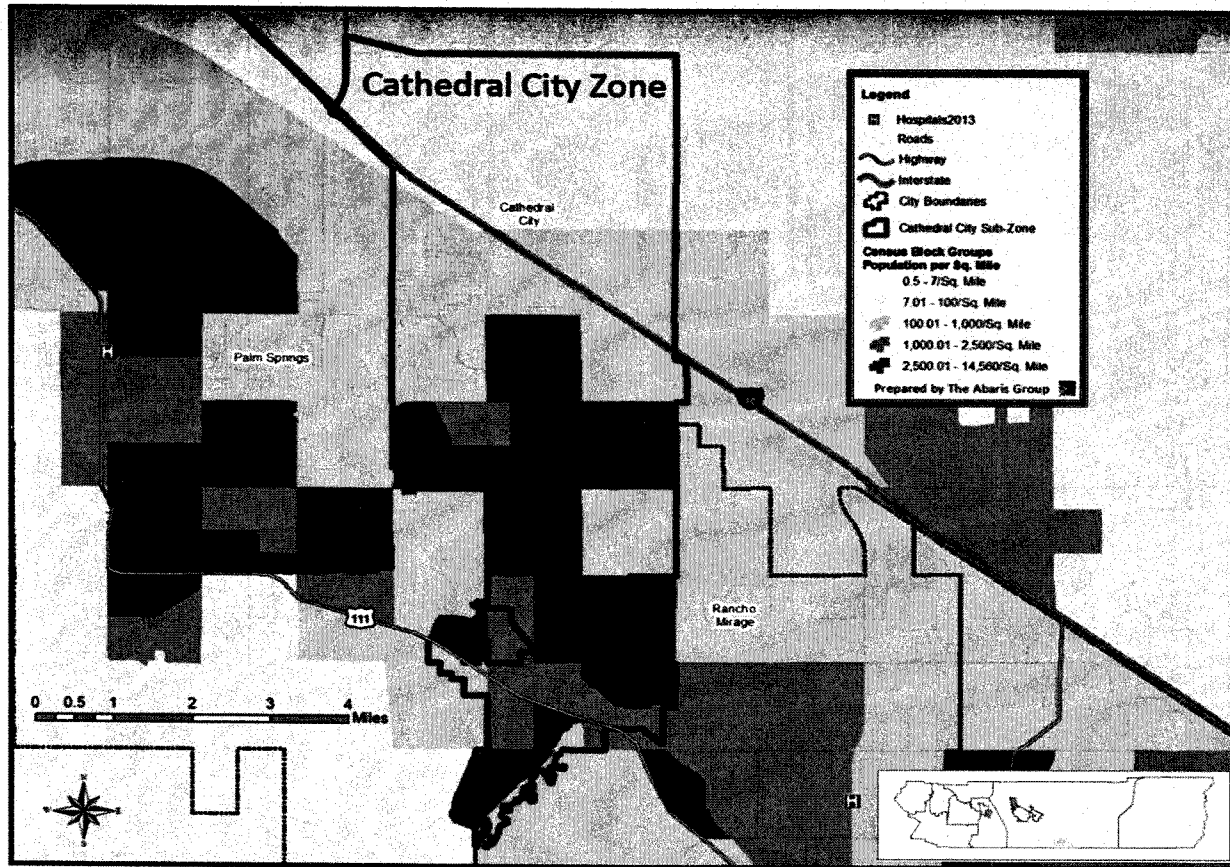


Figure 72 - Cathedral City Zone



Indio City Sub-Zone

Indio City Sub-Zone contains only the incorporated city of Indio (population 76,036). The Abaris Group has not received any data regarding response volume nor compliance information for this report.

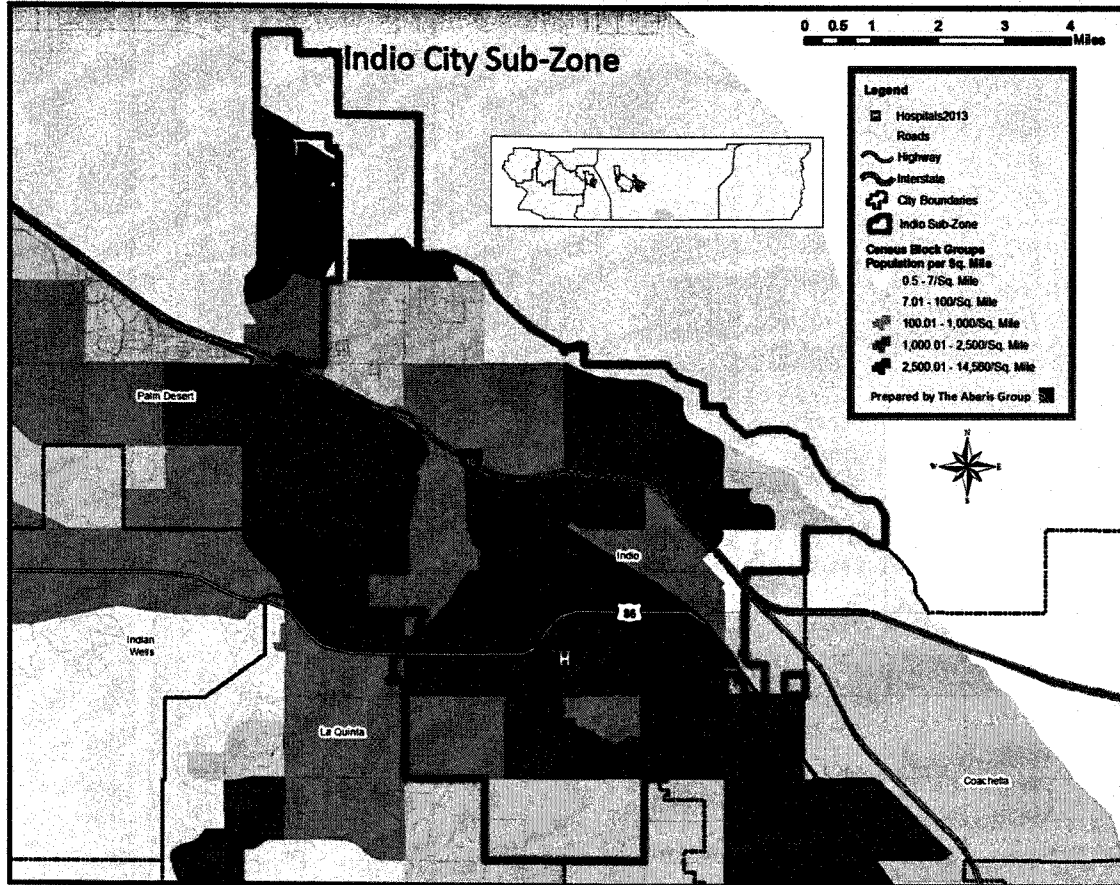


Figure 73 - Indio City Sub-Zone

Indio City Zone Determination – Non-exclusive

The zone is served through a cooperative agreement with Riverside County Fire Department. While it has been providing ALS ambulance services since 1997, they are not eligible for the specifications under Health and Safety Code, §1797.224.

The Indio City Sub-zone is also problematic as a stand-alone zone from the standpoint of the county EOA make-up. It removes a head count of 76,036 people from the Desert Zone (approximately 16 percent), and using a response ratio of 70 per 1,000 population, thus constitutes a loss of 5,320 responses annually. As with any carve-out, it creates a hole in the response area of the Desert Zone provider and negatively impacts its deployment plan.